Archival Report

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Suicide in Tourette's and Chronic Tic Disorders

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ABSTRACT

BACKGROUND: Persons with neuropsychiatric disorders are at increased risk of suicide, but there is little data concerning Tourette's and chronic tic disorders (TD/CTD). We aimed to quantify the risk of suicidal behavior in a large nationwide cohort of patients with TD/CTD, establish the contribution of psychiatric comorbidity to this risk, and identify predictors of suicide.

METHODS: Using a validated algorithm, we identified 7736 TD/CTD cases in the Swedish National Patient Register during a 44-year period (1969–2013). Using a matched case-cohort design, patients were compared with general population control subjects (1:10 ratio). Risk of suicidal behavior was estimated using conditional logistic regressions. Predictors of suicidal behavior in the TD/CTD cohort were studied using Cox regression models.

RESULTS: In unadjusted models, TD/CTD patients, compared with control subjects, had an increased risk of both dying by suicide (odds ratio: 4.39; 95% confidence interval [CI]: 2.89–6.67) and attempting suicide (odds ratio: 3.86; 95% CI: 3.50–4.26). After adjusting for psychiatric comorbidities, the risk was reduced but remained substantial. Persistence of tics beyond young adulthood and a previous suicide attempt were the strongest predictors of death by suicide in TD/CTD patients (hazard ratio: 11.39; 95% CI: 3.71–35.02, and hazard ratio: 5.65; 95% CI: 2.21–14.42, respectively).

CONCLUSIONS: TD/CTD are associated with substantial risk of suicide. Suicidal behavior should be monitored in these patients, particularly in those with persistent tics, history of suicide attempts, and psychiatric comorbidities. Preventive and intervention strategies aimed to reduce the suicidal risk in this group are warranted.

Keywords: Chronic tic disorder, Premature mortality, Psychiatric epidemiology, Suicide, Suicide attempt, Tourette's disorder

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Tourette's disorder (TD) and chronic tic disorder (CTD) are neurodevelopmental movement disorders characterized by multiple motor tics and at least one phonic tic in TD, and multiple motor or phonic tics in CTD, lasting more than a year (1). TD/CTD affect more boys than girls (3:1) and typically start between ages 4 and 6 years and are at their worse around ages 10 to 12 years. By the end of the second decade of life, many individuals are virtually free of tics, although approximately 20% of cases continue to experience clinically impairing tics as adults (2,3). TD/CTD were once thought to be rare, but increased recognition has resulted in a combined prevalence of about 1% of the population (4–6). The etiology is currently unknown, although genetic factors are thought to play a major role, together with environmental risk factors (7).

Individuals with psychiatric disorders are at high risk to die by suicide (8), with about 90% of people who kill themselves thought to suffer from a psychiatric disorder (9). However, very little is known about suicidal behavior in TD/CTD. In these disorders, suicidal ideation seems to be present in 6% to 10% of cases (10–13). However, despite the relatively high occurrence of suicidal thoughts, deaths by suicide and suicide attempts have been scarcely reported in the literature. A literature search performed by the authors (see Supplement) identified only 17 relevant publications on suicide and tic disorders, mostly consisting of single case studies or case series. Combined, these studies reported a total of seven deaths by suicide (14–17) and suicide attempts in 68 patients (10–12,14,18–27). Given the small numbers and the heterogeneity of the relevant studies, it is difficult to draw conclusions regarding the clinical characteristics and risk factors of suicidal behavior in this patient group.

The scarce attention that suicide has received in TD/CTD contrasts with the fact that a majority of patients (80%–90%) with tic disorders have one or multiple psychiatric comorbidities, including attention-deficit/hyperactivity disorder, obsessive-compulsive disorder, and depression (7,28). These comorbidities are often more problematic and require more attention than the tics themselves and, crucially, are associated with increased risk of suicidal behavior in their own right (29–31). For example, it is estimated that more than one-half of all people who die by suicide meet criteria for current depressive disorder (8). Moreover, depressive symptoms and negative affect are prominent in patients with TD (32–34). These symptoms, which have been shown to result in reduced quality of life in TD/CTD patients, could potentially lead to suicidal behavior in this group (32). In addition to psychiatric

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comorbidities, individuals with tic disorders often experience multiple stressors such as social isolation, bullying, and rejection (35,36), which are in turn well-documented risk factors for suicide (29,37). Despite this, the risk of suicidal behavior in patients with TD/CTD is currently unknown.

Given the relatively low prevalence of both TD/CTD and suicide, large samples of patients studied over long periods of time are needed to provide reliable risk estimates of suicide in this group. In this study, we used a large cohort of 7736 patients from the Swedish national registers diagnosed with TD/CTD over four decades (1969–2013) in order to 1) provide robust estimates of the risk of death by suicide and attempted suicide in this patient group, compared with matched control subjects, 2) determine to what extent tic disorders themselves are associated with suicidal behavior, after adjusting for comorbid psychiatric disorders, and 3) identify predictors associated with suicidal behavior among individuals with TD/CTD.

METHODS AND MATERIALS

The study was approved by the Regional Ethical Review Board in Stockholm (2013/862-31/5). The requirement for informed consent was waived because the study was register based and the included individuals were not identifiable at any time.

National Registers

Using the unique national identification numbers assigned to Swedish citizens and recoding for anonymity (38), we linked several Swedish nationwide population-based registers. The National Patient Register (NPR) includes diagnostic information on individuals admitted to a Swedish hospital since 1969. From 2001, the NPR also contains data on outpatient consultations in specialized care (39). Diagnoses are based on the ICD-8 (1969–1986), ICD-9 (1987–1996), and ICD-10 (1997–2013) manuals. The Cause of Death Register contains a record of all deaths in Sweden since 1952, with compulsory reporting nationwide. Each record contains the date of death and codes for causes of death, also in accordance to ICD codes. The Cause of Death Register covers >99% of all deaths in Swedish residents, including those occurring abroad, resulting in minimal loss of information (40). Demographic and socioeconomic data were derived from the Swedish Register of Total Population with supplementary data from the Education Register.

Variables

Patients with a diagnosis of TD or CTD (ICD-8 code 306.2; ICD-9 code 307C; ICD-10 codes F95.0 [transient tic disorder], F95.1 [chronic motor or vocal tic disorder], F95.2 [TD], F95.8 [other tic disorders], or F95.9 [unspecified tic disorder]) between January 1, 1969, and December 31, 2013, were identified from the NPR. Using a previously validated algorithm (41), individuals who had transient tics as their only or final diagnostic code within the same year of the initial diagnosis were excluded. Furthermore, individuals who received an initial diagnosis of transient, other, or unspecified tics were only included if they received at least an additional diagnosis of a tic disorder, except if the last available diagnosis was of transient tic disorder given within the same year of the initial diagnosis. This approach results in nearly perfect interrater reliability and highly valid diagnoses, with a positive predictive value of 0.89 in ICD-8, 0.86 in ICD-9, and 0.97 in ICD-10 (41). Patients with at least one inpatient record were classed as inpatients, and the remaining were classed as outpatients. Additionally, based on previous research on the natural history of tic disorders (2), we divided our cohort in two groups in order to identify those patients with persistent tics through to adult life: individuals whose tics had resolved by age 19 (i.e., no additional tic disorder diagnoses were registered beyond this point) and those who received diagnoses of TD/CTD beyond age 19.

Suicidal behavior was defined as a record of death by suicide (identified through the Cause of Death Register) or lifetime suicide attempts (hospital admissions or outpatient consultations in specialized care due to suicide attempts identified through the NPR). To avoid underestimation of suicidal behavior rates and to be consistent with recent suicide research (31,42), we included both certain and undetermined causes in our definitions of death by suicide and attempted suicide, as follows: “suicide and self-inflicted injury” (ICD-8 and ICD-9 codes E950–E959); “intentional self-harm” (ICD-10 codes X60–X84); “injury undetermined whether accidental or purposely inflicted” (ICD-8 and ICD-9 codes E980–E989); and “events of undetermined intent” (ICD-10 codes Y10–Y34). Methods of suicide were classified according to ICD grouping codes (for specific ICD codes, see the Supplement). Furthermore, methods were grouped into self-poisoning (poisoning) and self-injury (remaining methods) (31,43).

Because psychiatric disorders are known to increase the risk of suicide (29), we also obtained information on lifetime psychiatric disorders from the NPR. Comorbid diagnoses were grouped into obsessive-compulsive disorder, attention-deficit/hyperactivity disorder, pervasive developmental disorders, conduct disorders, psychotic disorders, personality disorders, anxiety disorders, intellectual disabilities, affective disorders, substance use disorders, and “other disorders” (including reaction to severe stress, and adjustment, dissociative, somatoform, and other neurotic disorders; for specific ICD codes, see the Supplement).

Parental education level was used as a proxy for the participants’ socioeconomic status (30,31). The highest attained education among the parents of patients and control subjects was categorized into three groups: elementary education (≤9 years), secondary education (10–12 years), and higher education (>12 years).

Statistical Analyses

We used a matched case-cohort design to estimate the risk of suicidal behavior in individuals diagnosed with TD/CTD compared with general population control subjects. Each TD/CTD patient in the cohort was matched on sex, birth year, and county of residence at the time of the first TD/CTD diagnosis with 10 general population control subjects, from the Swedish Register of Total Population, who had never been diagnosed with TD/CTD by the date of the corresponding cohort member’s date of first diagnosis.