



The role of impulse control disorders in Tourette syndrome: An exploratory study

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ABSTRACT

Introduction: Tourette syndrome (TS) is a neurodevelopmental condition characterised by the presence of multiple motor tics and one or more phonic tics, often associated with co-morbid behavioural problems. Impulse control disorders (ICDs) are a set of disorders where patients have significant difficulties in controlling their urges to perform rewarding behaviours. ICDs are expected to be common in patients with TS, as many problems reported in TS are related to difficulties in controlling impulsivity.

Aims: This exploratory study aimed to determine the clinical characteristics of ICDs in adult patients with TS, and to investigate the relationship between the presence of ICDs and health-related quality of life (HR-QOL).

Methods: Thirty-one patients with a diagnosis of TS were screened for ICDs using the Minnesota Impulsive Disorders Interview (MIDI). HR-QOL was assessed using a generic instrument, the Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) and a disease-specific scale, the Gilles de la Tourette Syndrome-Quality of Life Scale (GTS-QOL).

Results: Twenty-three out of 31 participants (74.2%) had at least one ICD. The most common ICDs were intermittent explosive disorder (51.6%) and compulsive buying disorder (41.9%). The number of ICDs significantly correlated with reduced HR-QOL ($p = 0.011$) as measured by the GTS-QOL, but not by the SF-36.

Conclusions: ICDs are common in patients with TS. HR-QOL measures specific to this patient population show that the presence of co-morbid ICDs results in poorer HR-QOL.

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1. Introduction

Tourette syndrome (TS) is a neurodevelopmental disorder characterised by the presence of multiple motor and phonic tics [1]. A number of epidemiological studies have demonstrated that TS is relatively common, affecting around 1% of school-age children, and is commonly associated with a number of behavioural and emotional co-morbidities, such as attention-deficit hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD) and affective disorders [2]. Moreover, antisocial behaviours, inappropriate sexual activity, non-obscene socially inappropriate behaviours and self-injurious behaviours have been reported in a substantial proportion of patients with TS, often in conjunction with impulse discontrol [3].

The fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) defines impulse control disorders (ICDs) as a set of clinical conditions characterised by significant difficulties in controlling impulses and reward-seeking behaviours despite their negative consequences [4]. This classification currently covers intermittent explosive disorder, kleptomania, pathological gambling, pyromania, trichotillomania, as well as other ICDs not otherwise

specified, which include compulsive Internet usage disorder, compulsive sexual behaviour and compulsive shopping disorder.

Intermittent explosive disorder, or uncontrolled aggression, appears to be problematic in 23 to 40% of patients with TS [5]; trichotillomania and compulsive sexual behaviour have also been reported to have a higher prevalence in patients with TS compared to the general population [6,7]. However, to date no studies have formally investigated the prevalence and clinical characteristics of ICDs as defined by the DSM-IV in patients with TS. We set out to systematically evaluate the presence of specific ICDs (compulsive buying disorder, kleptomania, trichotillomania, intermittent explosive disorder, pyromania, compulsive sexual behaviour, and compulsive computer use) in adult patients with TS, along with their potential impact on health-related quality of life (HR-QOL).

2. Methods

Consecutive outpatients with a clinical diagnosis of TS attending the Department of Neuropsychiatry, BSMHFT and University of Birmingham, UK, were invited to participate in this study. Patients with a limited understanding of English or learning disabilities were excluded from this study. All participants signed informed consent and NHS Research Ethics approval was obtained from the South Birmingham Research Ethics Committee. The patients underwent thorough neuropsychiatric assessment using the National Hospital Interview Schedule for Tourette

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syndrome [8] and the Yale Global Tic Severity Scale (YGTSS) [9]. ICDs were screened for using the Minnesota Impulsive Disorders Interview (MIDI), a reliable and valid semi-structured clinical interview [10]. HR-QOL was measured using two instruments: the disease-specific Gilles de la Tourette-Quality of Life Scale (GTS-QOL) [11] and the generic Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36) [12]. The GTS-QOL evaluates HR-QOL in patients with TS across four domains: psychological, physical, obsessional and cognitive, whilst the SF-36 consists of seven scales assessing physical functioning, bodily pain, social functioning, role limitation due to emotional problems, fatigue, general health perception and emotional wellbeing.

Descriptive statistics were used to analyse the prevalence and characteristics of individual ICDs. We used Spearman correlation coefficients to determine if there was a relationship between number of ICDs and measures of tic severity (YGTSS) and HR-QOL (GTS-QOL and SF-36).

3. Results

The demographic and clinical characteristics of the patients are presented in Table 1.

Twenty-three participants (74.2%) had at least one ICD as screened by the neuropsychiatric assessment incorporating the MIDI. The prevalence figures for each ICD are presented in Table 2. Multiple ICDs were common: 9 participants had one ICD, 7 had two, 4 had three, 2 had four and 1 had five.

Table 3 shows the correlations between number of ICDs and measures of tic severity and HR-QOL. There was a significant association between number of ICDs and higher YGTSS scores. Moreover, the number of ICDs was associated with poorer HR-QOL, as measured by the total GTS-QOL score and all the GTS-QOL subscales. We also found a negative association (not statistically significant) between the number of ICDs and the GTS-QOL measure of overall life satisfaction. Conversely, correlations between number of ICDs and subscales of the generic HR-QOL measure (SF-36) were not significant, with the exception of the subscale of role limitation due to emotional problems. Likewise, correlations between number of ICDs and socio-demographic variables were not significant (e.g. age: $r = -0.211$; $p = 0.263$).

With regards to the presence of behavioural co-morbidities, although small numbers did not allow formal correlation analyses, we found that all four patients with a diagnosis of co-morbid OCD reported at least one ICD (compulsive computer use, trichotillomania: $n = 3$; compulsive buying and intermittent explosive disorder: $n = 2$). Finally, with regards to medications, the most prescribed agents for tic symptoms were risperidone ($n = 4$) and sulpiride ($n = 3$), whilst the most prescribed agents for ICD symptoms were fluoxetine ($n = 4$) and citalopram ($n = 3$).

4. Discussion

Our study shows that ICDs are common in patients with TS, with 74.2% of the sample having at least one ICD. This figure vastly exceeds

Table 2

Prevalence of impulse control disorders in the sample of patients with Tourette syndrome ($n = 31$).

Intermittent explosive disorder, n (%)	16 (51.6)
Compulsive buying disorder, n (%)	13 (41.9)
Compulsive computer use, n (%)	7 (22.6)
Kleptomania, n (%)	4 (12.9)
Trichotillomania, n (%)	3 (9.7)
Pyromania, n (%)	3 (9.7)
Compulsive sexual behaviour, n (%)	2 (6.5)

the estimated prevalence of ICDs in both healthy subjects (8.9%) [13] and psychiatric inpatients (approximately 30%) [14–16]. These findings are consistent with previous reports of ICDs in TS [6]. The clinical continuum between tic symptoms and ICDs is also highlighted by the correlation between tic severity scores and number of ICDs, suggesting that patients with more severe tics are more susceptible to developing ICDs. The presence of ICDs in all patients with co-morbid OCD suggests the possibility that compulsive symptoms can mediate or strengthen the clinical continuum from complex tics to impulsive behaviours.

Intermittent explosive disorder was the most common ICD in our sample (51.6%). This figure is consistent with preliminary research on rage attacks, explosive outbursts and aggressive behaviours in TS populations [17–20]. All of the other ICDs were also strongly represented in this sample and appear to be a major problem for patients with TS. Of note, our findings overlapped only partially with the results from studies of ICDs associated with dopaminergic drugs or surgical procedures for the treatment of Parkinson disease [21]. For instance, a large cross-sectional study of 3090 patients with Parkinson disease by Weintraub et al. [22] found a lower prevalence of ICDs. Amongst directly comparable figures, they found a point prevalence of only 5.7% for compulsive buying disorder and 3.5% for compulsive sexual behavior, suggesting that specific pathophysiological mechanisms underlie the expression of different ICDs in patients with pharmacologically mediated dopaminergic dysregulation.

All the subscores of the GTS-QOL suggested a significant association between number of ICDs and reduced HR-QOL. Reduced HR-QOL may be a consequence of the impulsive behaviours which patients are constantly having to battle against. The fact that the SF-36 failed to capture the association between number of ICDs and HR-QOL is likely to

Table 3

Correlation between number of impulse control disorders and measures of tic severity and health-related quality of life in patients with Tourette syndrome.

	Correlation coefficient (r)	Sig (p)
YGTSS	0.412	0.024
GTS-QOL total ^a	0.471	0.011
GTS-QOL physical ^a	0.415	0.028
GTS-QOL obsessional ^a	0.456	0.013
GTS-QOL cognitive ^a	0.531	0.003
GTS-QOL psychological ^a	0.394	0.031
GTS-QOL life satisfaction	−0.248	0.186
SF-36 total	−0.141	0.491
SF-36 present health	−0.077	0.693
SF-36 general health	−0.141	0.466
SF-36 physical functioning	0.123	0.531
SF-36 role limitation due to physical health)	−0.043	0.826
SF-36 role limitation due to emotional problems)	−0.390	0.040
SF-36 social functioning	−0.002	0.990
SF-36 pain	0.120	0.536
SF-36 fatigue	−0.187	0.332
SF-36 emotion	−0.226	0.247

Abbreviations. YGTSS, Yale Global Tic Severity Scale; GTS-QOL, Gilles de la Tourette Syndrome – Quality of Life Scale; SF-36, Medical Outcomes Study 36-Item Short-Form Health Survey.

^a Higher scores indicate greater interference with daily life and therefore reduced health-related quality of life.

Table 1

Demographic and clinical characteristics of the patients with Tourette syndrome ($n = 31$).

Age, mean (sd)	32.5 (15.4)
Male, n (%)	20 (64.5)
YGTSS, mean (sd)	44.8 (16.1)
ADHD, n (%)	8 (27.6)
OCD, n (%)	4 (13.8)
Affective disorder, n (%)	13 (44.8)
Neuroleptic medication, n (%)	12 (41.4)
SSRI medication, n (%)	10 (34.5)

Abbreviations. YGTSS, Yale Global Tic Severity Scale; ADHD, attention-deficit hyperactivity disorder; OCD, obsessive-compulsive disorder.

be related to the fact that the SF-36 is a generic health status instrument which focuses on the general limitations in everyday life [23], thus underestimating issues specific to patients with TS.

Our findings suggest that there should be increased awareness of the possibility of a patient with TS displaying an ICD, as ICDs appear to be common and detrimental to HR-QOL. Patients who are referred to specialist clinics for TS are likely to be at a particularly high risk of displaying ICDs, and clinicians should be aware of this throughout their assessment protocol and management plan. The diagnosis of ICDs may have treatment implications for patients with TS, as it has been suggested that ICDs complicate the clinical picture in psychiatric disorders [24]. In turn, the recognition and management of ICDs is expected to result in improvement of aspects of HR-QOL which are relevant to patients with TS.

This exploratory study has several limitations. The relatively small sample of 31 participants may have caused infrequent ICDs (e.g. compulsive sexual behaviour) to be over-represented statistically within the sample. The sample recruited for this study represents a relatively selected subset of patients with TS, and this needs to be taken into consideration when applying these results to other TS populations. For instance, our patients had more severe tics compared to a community-based sample, hence their referral to a specialist clinic (referral bias). Likewise, a potential explanation for the high prevalence of ICDs is that individuals with TS and co-morbid ICDs are selectively referred to specialist clinics because of this association of clinical conditions, which makes them more difficult to manage in primary care [25]. A further limitation is intrinsic to the ICDs screening instrument, the MIDI, which relies on the subject's recollection of pathological behaviours. These limitations clearly restrict the generalisability of our findings.

As this is the first study to formally investigate the prevalence of DSM-IV-defined ICDs in TS, there is vast scope for further research. Future studies should investigate ICDs within different TS populations (e.g. community-based patients or children with TS). Similar studies could also be pursued outside the United Kingdom in order to establish cross-cultural figures for the prevalence of specific ICDs in patients with TS. It would also be interesting to note whether the various treatments for the tics and the behavioural symptoms of TS have any effects on ICDs as well. Finally, since ICDs appear to negatively affect disease-specific HR-QOL, longitudinal studies should be conducted to investigate whether successful treatment of ICDs results in improved HR-QOL in the TS population.

Conflicts of interest

None.

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