

SHORT COMMUNICATION

Rapid onset of functional tic-like behaviours in young adults during the COVID-19 pandemic

Tamara Pringsheim  | Davide Martino 

Department of Clinical Neurosciences,
University of Calgary, Calgary, Alberta,
Canada

Correspondence

Tamara Pringsheim, Department of
Clinical Neurosciences, University of
Calgary, 3350 Hospital Drive NW, Calgary
T2N 1N4, AB, Canada.

Email: tmprings@ucalgary.ca

Abstract

Background and purpose: Clinicians have reported an increase in functional tic-like behaviours in children and youth during the COVID-19 pandemic. We describe adults developing rapid onset of functional tic-like behaviours between May 2020 and June 2021.

Methods: Data were analysed from the Adult Tic Disorders Registry, a single-site, 12-month prospective cohort study that began enrolment in January 2021. We compared clinical features of participants with Tourette syndrome or persistent motor/vocal tic disorder to participants with rapid onset tic-like behaviours.

Results: Thirty-three participants registered between January and June of 2021; nine had rapid onset tic-like behaviours, and 24 had Tourette syndrome or persistent motor tic disorder. Participants with rapid onset tic-like behaviours were younger (19.9 vs. 38.6 years, $p = 0.003$), had older age at onset (15.3 vs. 10.1, $p = 0.0009$), and were more likely female ($p < 0.0001$). They had higher motor and vocal tic severity and impairment scores (all $p < 0.01$) and were more likely to have complex arm/hand motor tics ($p < 0.0001$), complex vocal tics ($p < 0.0001$), and coprolalia ($p = 0.004$). They had significantly higher scores on all mental health symptom self-report measures (all $p < 0.05$) and were significantly more likely to be diagnosed with depression ($p = 0.03$).

Conclusions: The clinical features that help differentiate rapid onset tic-like behaviours from Tourette syndrome or persistent motor tic disorder include their phenomenology, onset age, and clinical course. Rapid onset tic-like behaviours are a distinct subtype of functional neurological disorder that has emerged during the COVID-19 pandemic in young people and appears to be strongly socially influenced.

KEYWORDS

COVID-19 pandemic, functional neurological disorders, social media, Tourette syndrome

INTRODUCTION

Since the second wave of the COVID-19 pandemic, clinicians worldwide have reported an influx of young people, predominantly female teenagers, presenting with the rapid first onset of complex motor and vocal tic-like behaviours [1]. These tic-like behaviours develop

and peak in severity within hours to days, cause significant functional impairment, and display phenomenological similarities to popular TikTok video content of individuals with tics or tic-like behaviours [2,3]. In January 2021, we launched our Adult Tic Disorders Clinical Registry, a prospective cohort study enrolling all adults seen in our program with tics. The goal of the registry is to document

This is an open access article under the terms of the Creative Commons Attribution-NonCommercial License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2021 The Authors. *European Journal of Neurology* published by John Wiley & Sons Ltd on behalf of European Academy of Neurology

clinical characteristics of adults with tic disorders, their comorbidity and impairment profiles, and the evolution of tic symptoms over a 12-month period. The rise in tic-like behaviours during this period allowed us to enrol into the registry several young people presenting for the first time with these symptoms. In this short communication, we contrast clinical features present at the registration visit in adults with rapid onset tic-like behaviours to those seen in adults with Tourette syndrome (TS), persistent motor tic disorder (PMTD) or persistent vocal tic disorder (PVTD), with the goal of identifying clinical features to help clinicians differentiate between these disorders.

METHODS

All patients referred to and followed by the Calgary Movement Disorders Program for tics are invited to participate in the Adult Tic Disorders Clinical Registry. The registry was approved by the Calgary Health Research Ethics Board, and all participants provided written informed consent. The Calgary Movement Disorders Program is the only specialized clinic for adults with tic disorders in southern Alberta. At registration, participants complete several self-report questionnaires, including the Obsessive-Compulsive Inventory (OCI), the Adult Self-Report Scale (ASRS) for ADHD, the Patient Health Questionnaire (PHQ9) for depression, the Generalized Anxiety Disorder-7 items (GAD7), the Tobacco, Alcohol, Prescription Medications, and Other Substance Tool, the Premonitory Urge for Tics Scale, and the Gilles de la Tourette Quality of Life Scale (GTSQOL). The clinician collects demographic and clinical information from the patient through clinical interview, confirms diagnoses, and performs the Yale Global Tic Severity Scale (YGTSS). For comparison, we grouped patients into two categories (i) primary tic disorder or (ii) rapid onset tic-like behaviours. The primary tic disorder category included patients with TS, PMTD, or PVTD who were diagnosed based on fulfilment of Diagnostic and Statistical Manual of Mental Disorders, 5th edition criteria and a clinical history congruent with these disorders. Categorization into the rapid onset tic-like behaviours group was based on history of abrupt onset of complex tic-like behaviours with escalation to peak severity within hours to days. All diagnoses were made by two movement disorders specialists with expertise in tic disorders. Continuous variables were compared between groups using a two-sample *t*-test; categorical variables were compared using the Fisher exact test. As this was an exploratory analysis, *p*-values <0.05 were considered statistically significant.

RESULTS

Between 5 January and 5 June, 33 adults were enrolled in the Adult Tic Disorders Registry, 24 with TS/PMTD and nine with rapid onset tic-like behaviours. All 24 adults with TS/PMTD had onset of tics in childhood. Of the nine adults with rapid onset functional tic-like behaviours, seven presented with the first ever onset of tic-like

movements during the COVID-19 pandemic, and two had a history of mild simple motor or vocal tics in childhood with sudden and dramatic onset of complex tic-like behaviours during the pandemic. In all nine of these patients, symptom onset occurred between May 2020 and April 2021. Table 1 provides the demographic and clinical characteristics of each group.

All participants with rapid onset tic-like behaviours reported symptom onset over a period of hours to days, with many able to give a precise date of onset. All endorsed the presence of premonitory urges prior to tics, suggestibility, and distractibility, and suppressibility was present in six of nine cases. Participants with rapid onset tic-like behaviours were significantly younger but with later age of onset, were more likely to be female, were more likely to be diagnosed with depression, were more likely to have complex arm/hand tics, complex vocal tics, and coprolalia, and had significantly higher scores on the ASRS, OCI, GAD7, PHQ9, GTSQOL, and YGTSS. Several patients with rapid onset complex tic-like behaviours displayed the same repertoire of complex motor tics, including tapping, clapping, thumping the chest, and hitting objects, and the same complex phonic tics, including “beans,” “knock knock,” and “woo hoo.” All nine adults with rapid onset functional tic-like behaviours reported exposure to social media with #Tics and #Tourettes. Exposure to social media prior to or around onset was not assessed formally in adults with TS/PMTD, as all patients had a >10-year history of typical TS/PMTD.

DISCUSSION

In this prospective cohort study, we found several clinical characteristics that differentiated adults with rapid onset functional tic-like behaviours from adults with TS/PMTD/PVTD, despite a small sample size of only 33 participants. These distinctive characteristics are similar to the clinical features previously proposed as characterizing functional tic-like behaviours [4]. Tics and functional tic-like behaviours share phenomenological traits and may coexist [4] making this differential diagnosis challenging, especially for nonexpert clinicians. The most distinguishing clinical features for the diagnosis of functional tic-like behaviours, besides the rapid onset of symptoms, were the high frequency of upper limb involvement, complex vocalizations and coprophenomena, female gender, and later age of onset. The dramatic course of these rapid onset tic-like behaviours is reflected by higher symptom severity ratings on the YGTSS, and a greater impact on quality of life on both the YGTSS and the GTSQOL. The rapid progression of complex tic-like behaviours over hours to days is inconsistent with the known clinical course of primary tic disorders [5] which typically begin insidiously with simple motor tics in early childhood, wax and wane in frequency and severity, demonstrate a rostrocaudal progression over time [6] and increase in complexity over a period of years. Most patients in the rapid onset group demonstrated no simple motor tics of the face or simple vocal tics, which are the most common tics in patients with primary tic disorders.

TABLE 1 Clinical characteristics of Adult Tic Disorders Registry participants

Characteristic	Rapid onset tic-like behaviours, n = 9	Primary tic disorders [TS, PMTD, PVTD], n = 24	p
Age, years, mean (95% CI)	19.9 (18.8–21.0)	38.6 (30.7–46.5)	0.003
Gender, proportion	Female 100%	Female 25%	<0.0001
Age at onset, years, mean (95% CI)	15.3 (10.7–20.0)	10.1 (9.0–11.3)	0.0009
ADHD diagnosis, proportion	22%	25%	1.00
ASRS score, mean (95% CI)	17.3 (13.9–20.6)	11.8 (9.2–14.3)	0.01
OCD diagnosis, proportion	0%	33%	0.07
OCI score, mean (95% CI)	60.5 (18.2–102.8)	30.4 (18.3–42.6)	0.02
Anxiety diagnosis, proportion	56%	25%	0.12
GAD7 score, mean (95% CI)	14.0 (8.3–19.7)	9.6 (7.3–11.9)	0.04
Depression diagnosis, proportion	44%	8%	0.03
PHQ9 score, mean (95% CI)	19.0 (14.1–23.9)	9.0 (6.3–11.6)	0.0002
Substance use disorder, proportion	11%	4%	0.47
No psychiatric comorbidity, proportion	11%	42%	0.21
GTSQOL, mean (95% CI)	90.4 (72.1–108.6)	60.1 (50.2–69.9)	0.001
PUTS, mean (95% CI)	25.8 (19.6–31.9)	23.0 (19.2–26.7)	0.21
YGTSS Motor Tic Severity Score, mean (95% CI)	16.9 (13.7–20.1)	10.7 (8.8–12.6)	0.0005
YGTSS Vocal Tic Severity Score, mean (95% CI)	14.6 (10.2–18.9)	8.1 (5.7–10.5)	0.004
YGTSS Impairment Score, mean (95% CI)	33.8 (22.0–45.5)	19.1 (14.4–23.8)	0.003
Presence of complex arm/hand motor tics, proportion	89%	13%	<0.0001
Presence of complex vocal tics, proportion	89%	8%	<0.0001
Presence of coprolalia, proportion	67%	4%	0.0004

Abbreviations: ADHD, attention-deficit hyperactivity/impulsivity disorder; ASRS, Adult Self-Report Scale; CI: confidence interval; GAD7, Generalized Anxiety Disorder-7 items; GTSQOL, Gilles de la Tourette Quality of Life Scale; OCD, obsessive-compulsive disorder; OCI, Obsessive-Compulsive Inventory; PHQ9, Patient Health Questionnaire for depression; PUTS, Premonitory Urge for Tics Scale; PVTD, persistent vocal tic disorder; TS, Tourette syndrome; YGTSS, Yale Global Tic Severity Scale.

Functional tic-like behaviours have been described in the past by others but are infrequently reported. In a large case series of functional movement disorders, functional tics accounted for only 2% of cases [7]. Previous reports include in 2012, when 19 teenagers at Le Roy High School in New York state developed sudden onset of tic-like movements, with dramatic jerking movements involving one or both arms and their head and neck, which was ultimately diagnosed as conversion disorder with mass psychogenic illness [8]. Demartini et al. [7] presented a case series of 11 adult patients with the abrupt onset of functional tics seen over a period of nearly 3 years at a national referral centre. In contrast to our cases, patients were older, with a mean age at onset of 37 years, and more males were affected than females. None of the patients presented with pali-, echo-, or coprophenomena. Ganos et al. [9] presented a case series of 13 adolescents and adults with coprolalic and other functional tic-like complex vocalizations collected from a sample of 1500 patients over a 20-year period. Although there were very few cases, the authors believe that the prevalence of functional coprolalia increased in their sample over the past decade due to raised awareness of TS.

Self-reported symptoms on measures of ADHD, anxiety, depression, and obsessive-compulsive behaviours were significantly higher

in adults with rapid onset tic-like behaviours compared to adults with primary tic disorders in our sample. Despite the greater report of symptoms, the only significant difference in comorbid mental health diagnoses between groups was for depression. Although more than half of patients in the rapid onset tic-like behaviour group were diagnosed with an anxiety disorder, 25% of our primary tic disorder patients have also been diagnosed with an anxiety disorder, so the difference between groups was not significant. Although patients in the rapid onset tic-like behaviour group reported more ADHD symptoms and obsessive-compulsive behaviours, in-depth clinical interview did not reveal a symptom history congruent with the diagnosis of these disorders.

We believe the increase in functional tic-like behaviours during this time period is related to pandemic-induced psychosocial stress, social isolation, and disease modelling through social media. Over the course of the COVID-19 pandemic, there has been a significant increase in mental health symptoms and demand for mental health services [10,11]. Pandemic-related restrictions on social gatherings have significantly curtailed opportunities for face-to-face interactions, and a dramatic increase in use of social media platforms has occurred [12]. Relatedly, there has been dramatic growth in video material of youth manifesting tic disorders shared on social

networks, generating millions of views. It is impossible to ignore the similarity of the repertoire of tic-like behaviours between our rapid onset cases and those seen on the social media channels of the most prolific influencers.

Differentiating between tics and functional tic-like movements is important as the approach to treatment is distinct, with prioritization of functional behavioural interventions in the latter. As we believe that individuals with rapid onset functional tic-like behaviours have a functional neurological disorder, we do not expect the pharmacological treatments used for individuals with primary tic disorders to be effective for these cases. Our treatment approach for these patients has included psychoeducation with patients and families to improve acceptance and understanding of the diagnosis, appropriate treatment of anxiety and/or depression if present, and behavioural therapy for tic-like behaviours. We have favoured the use of the Comprehensive Behavioural Intervention for Tics, [13] but with greater emphasis on the functional behavioural assessment and intervention than habit reversal therapy. The functional behavioural assessment focuses on identifying and addressing the internal and external antecedents and consequences of functional tic-like behaviours. We have had preliminary success with many patients using this approach and are currently collecting data as part of our prospective cohort study on short-term and long-term outcomes.

In conclusion, we propose that rapid onset tic-like behaviours are a distinct subtype of functional neurological disorder. The incidence of this functional neurological disorder phenotype has increased in young people since 2020, possibly related to the COVID-19 pandemic, and appears to be strongly socially influenced. A diagnosis of rapid onset functional tic-like behaviours can be made based on positive clinical features and incongruency of symptom onset and progression with primary tic disorders.

CONFLICT OF INTEREST

Neither of the authors has any conflict of interest to disclose.

AUTHOR CONTRIBUTIONS

Tamara Pringsheim: Conceptualization (lead), data curation (lead), formal analysis (lead), investigation (lead), methodology (lead), project administration (lead), writing—original draft (lead). **Davide Martino:** Conceptualization (supporting), investigation (supporting), methodology (supporting), project administration (supporting), writing—review & editing (equal).

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ORCID

Tamara Pringsheim  <https://orcid.org/0000-0002-8229-8431>

Davide Martino  <https://orcid.org/0000-0002-2217-0487>

REFERENCES

1. Heyman I, Liang H, Hedderly T. COVID-19 related increase in childhood tics and tic-like attacks. *Arch Dis Child*. 2021;106(5):420-421.
2. Hull M, Parnes M. Tics and TikTok: functional tics spread through social media. *Mov Disord Clin Pract*. n/a(n/a). <https://doi.org/10.1002/mdc3.13267>
3. Hull M, Parnes M, Jankovic J. Increased incidence of functional (psychogenic) movement disorders in children and adults amidst the COVID-19 pandemic: a cross-sectional study. *Neurol Clin Pract*. 2021. <https://doi.org/10.1212/CPJ.0000000000001082>
4. Ganos C, Martino D, Espay AJ, Lang AE, Bhatia KP, Edwards MJ. Tics and functional tic-like movements. *Can we tell them apart?* 2019;93(17):750-758.
5. Leckman JF, Zhang H, Vitale A, et al. Course of tic severity in Tourette syndrome: the first two decades. *Pediatrics*. 1998;102(1 Pt 1):14-19.
6. Ganos C, Bongert J, Asmuss L, Martino D, Haggard P, Münchau A. The somatotopy of tic inhibition: where and how much? *Mov Disord*. 2015;30(9):1184-1189.
7. Demartini B, Ricciardi L, Parees I, Ganos C, Bhatia KP, Edwards MJ. A positive diagnosis of functional (psychogenic) tics. *Eur J Neurol*. 2015;22(3):527-e536.
8. Mink JW. Conversion disorder and mass psychogenic illness in child neurology. *Ann N Y Acad Sci*. 2013;1304:40-44.
9. Ganos C, Edwards MJ, Müller-Vahl K. "I swear it is Tourette's!": on functional coprolalia and other tic-like vocalizations. *Psychiatry Res*. 2016;246:821-826.
10. Daly M, Robinson E. Anxiety reported by US adults in 2019 and during the 2020 COVID-19 pandemic: population-based evidence from two nationally representative samples. *J Affect Disord*. 2021;286:296-300.
11. Daly M, Robinson E. Longitudinal changes in psychological distress in the UK from 2019 to September 2020 during the COVID-19 pandemic: Evidence from a large nationally representative study. *Psychiatry Res*. 2021;300:113920.
12. Digital KS. Global Overview Report; 2021. Published 2021. Accessed May 24, 2021.
13. Woods DW, Piacentini J, Chang S, et al. *Managing Tourette Syndrome. A Behavioral Intervention for Children and Adults*. Oxford University Press; 2008.

How to cite this article: Pringsheim T, Martino D. Rapid onset of functional tic-like behaviours in young adults during the COVID-19 pandemic. *Eur J Neurol*. 2021;00:1-4. <https://doi.org/10.1111/ene.15034>