Curr Dev Disord Rep (2017) 4:61–63
DOI 10.1007/s40474-017-0113-2

INVITED COMMENTARY

Tourette's Syndrome and Comorbid Neurological Condition

Raman Baweja[1] · **Debra Byler**[2]

Published online: 9 June 2017

Abstract Tourette syndrome (TS) often presents with other comorbid conditions in clinical settings. The most common comorbidities are obsessive-compulsive disorder or obsessive-compulsive behaviors, attention deficit hyperactivity disorder, learning disabilities, autism, mood and anxiety disorders, and personality disorders. Comorbid disorders and coexistent psychopathologies are often associated with impaired functioning, more severe course, and poorer long-term outcome. The overall presentation of TS with and without comorbidities can be significantly different and comorbid neuropsychiatric conditions may also change with age. Thus, frequent reassessment of symptoms and re-ordering of treatment priorities are needed when following the child over the developmental timeline.

Keywords Tourette's syndrome · Obsessive-compulsive disorder · Attention deficit hyperactivity disorder · Neuropsychiatric disorders

Invited Commentary

The vast majority of children and teens who present with Tourette syndrome (TS) have symptoms of other neuropsychiatric conditions. Findings from the Tourette Syndrome International Consortium (TIC) database (a collaborative, multisite investigation) showed that 88% of these patients had comorbidities or coexistent psychopathologies [1]. In order to provide comprehensive care for these patients, thorough exploration of possible comorbid conditions is necessary.

The most common comorbidities with TS are obsessive-compulsive disorder (OCD) or obsessive-compulsive behaviors, attention deficit hyperactivity disorder (ADHD), learning disabilities, autism, mood disorders such as depression and bipolar disorder, anxiety disorders, personality disorders, and conduct disorder including oppositional defiant disorder [1, 2]. A subset of children with TS also has fine motor control and visual-motor integration impairment. Studies have shown that the impact of comorbid psychopathology on the quality of life is often more significant than the tics themselves [3].

The overall presentation of TS with and without comorbidities can be significantly different. The underlying pathophysiology of this co-occurring phenomenon remains unclear. One of the fascinating aspects of this condition is the evolution of symptoms over the lifespan. Youth often present with ADHD symptoms initially followed by emergence of tics. In contrast OCD and mood symptoms may occur after presentation of tics. Many patients with tics improve significantly by adulthood in regard to tic severity; however, the emergence and persistence of other neuropsychiatric symptoms like OCD often contribute substantially to continued suffering by the patients, even after the tics have somewhat abated. The reason for these different symptomatic outcomes remains unexplained. Health care providers must continually reassess for comorbidities, which may emerge or evolve over time, and not be evident on initial presentation.

OCD is characterized by the presence of obsessions (recurrent and persistent intrusive thoughts, urges, or images that are experienced and unwanted) and/or compulsions (repetitive seemingly purposeful behaviors or mental acts usually performed in response to an obsession, in accord with certain

✉ Raman Baweja
rbaweja@pennstatehealth.psu.edu

[1] Department of Psychiatry, Penn State University College of Medicine, 500 University Dr., H073, Hershey, PA 17033-0850, USA

[2] Department of Pediatric Neurology, Penn State University College of Medicine, 500 University Dr, Hershey, PA 17033, USA

rules, or in a stereotyped fashion) [4]. Obsessive-compulsive behaviors (OCB) become a disorder (OCD) when symptoms take up more than 1 h of the day and are sufficiently severe to cause marked distress or have significant impairment in an important area of functioning. Obsessive-compulsive behaviors occur in 36% of patients with TS, and typically these symptoms emerge several years after the onset of tics [5]. OCB or OCD typically becomes more severe at a later age and are more likely to persist than tic symptoms. The presence of OCD causes additional impairment on school, social, and family functioning of youth with TS [6]. Study showed that TS and OCD are genetically related and OCD might be a sex-dependent alternative phenotype of TS [7].

There are differences between behaviors in TS patients with OCD and those with only OCD [8, 9]. Patients with TS often have more blurting out of obscenities, saying or doing things in a specific orders, symmetrical requirement, sexual and violent theme obsessions, counting compulsions, imitating of others' movements, forced touching, etc. In contrast, patients with OCD often prefer doing things in a specific order, cleaning, touching, and arranging items, contamination with dirt and germs, obsession of people hurting each other, and fears of something bad happening. More importantly, compulsions in OCD are often preceded by cognitions. Patients with combined TS plus OCD correlated with more severe tics and are often associated with other psychiatric diagnoses. Additionally, youth TS plus OCD has more violent, symmetrical, and sexual obsessions and more touching, blinking, counting, and self-injurious behaviors and compulsions [10].

ADHD is a neurodevelopmental disorder, characterized by poor attention and concentration, impulsivity, and hyperactivity with symptoms that begins in early childhood. ADHD is present in about 60% youth with TS and typically precedes the onset of tics [11]. Comorbid ADHD is not associated with the severity of tics in TS; however, youth with combined ADHD with TS are more severely impaired at home, school, and with peers and have more emotional and behavioral problems and psychosocial difficulties [12]. Similarly, adults with comorbid ADHD symptoms with TS are associated with more severe aggression towards others, destructions of property, greater substance abuse, and encounters with the justice system, as well as other psychopathology (depression, anxiety etc.) [13]. Studies have shown that TS and ADHD are not genetically related. However, there is likely an overlap in their underlying neurobiology [11].

Youth with TS usually have normal intellectual functioning. Nonetheless, they often have poor school performance, which is likely related to comorbid learning disabilities. In a clinical sample, around one-fourth of patients with TS presented with learning disabilities [14]. It has been suggested that ADHD may play a potential confounder or an important comorbid condition in youth with LD [15].

Studies have indicated that TS in patient with autism spectrum disorder (ASD) exceeds that expected by chance and around 6–8% ASD youth also has comorbid TS [16]. Genetic linkage between ASD and TS has been also suggested, specifically for *CNTNAP2*, *IMMP2L*, and the neurexin family of genes [3].

Several studies, from both community and clinical samples, have found an increased prevalence of depression (13–76%) and associated suicidal ideations in patients with TS [17]. The etiology of depression in TS is multifactorial; it is possible that these symptoms are related to having a socially disabling disorder and the associated stigma. Personality traits/disorders are more frequent in TS, specifically schizotypal personality disorder [18]. Migraine and tension headache have been also reported 4–5 times greater in TS than those of general pediatric population [19].

Helping patients and families understand the concept of comorbidities can also be challenging. Many families are frustrated with the lack of a single medication or treatment to address their problems and feel like they are taking a pill for each problem. Most patients and families can visualize a school of fish swimming together or a flock of birds flying together. Using this visual illustration sometimes helps them grasp the idea that the problems are related and tend to occur together, but each one must be addressed separately. We do not know yet about why these problems co-occur, but it likely relates to parallel circuitry within the motor control, limbic, and frontal areas of the brain.

Comorbid disorders and coexistent psychopathologies are common in TS and often associated with impaired functioning, more severe course, and poorer long-term outcomes. The identification and treatment of comorbid conditions remain one of the greatest challenges in effective treatment of these individuals. A comprehensive, multidisciplinary approach addressing academic, behavioral, and movement disorder and psychiatric components is needed. Often the list of problems is quite large, and the health care providers must strategize as to which concerns warrant the greatest efforts in treatment. These priorities often change over time as the child matures and the expression of the comorbid conditions evolves. Thus, frequent reassessment of symptoms and re-ordering of treatment priorities are needed when following the child over the developmental timeline.

Compliance with Ethical Standards

Conflict of Interest Raman Baweja and Debra Byler declare that they have no conflict of interest.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

Funding Sources None.

References

1. Freeman RD, Fast DK, Burd L, Kerbeshian J, Robertson MM, Sandor P. An international perspective on Tourette syndrome: selected findings from 3,500 individuals in 22 countries. Dev Med Child Neurol. 2000;42:436–47.
2. Kurlan R, Como PG, Miller B, Palumbo D, Deeley C, Andresen EM, et al. The behavioral spectrum of tic disorders: a community-based study. Neurology. 2002;59:414–20.
3. Robertson MM. A personal 35 year perspective on Gilles de la Tourette syndrome: prevalence, phenomenology, comorbidities, and coexistent psychopathologies. Lancet Psychiatry. 2015;2:68–87.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders, fifth edition ed. Washington, DC: American Psychiatric Press; 2013.
5. Robertson MM, Trimble MR, Lees AJ. The psychopathology of the Gilles de la Tourette syndrome. A phenomenological analysis. Br J Psychiatry. 1988;152:383–90.
6. Robertson MM, Banerjee S, Eapen V, Fox-Hiley P. Obsessive compulsive behaviour and depressive symptoms in young people with Tourette syndrome. A controlled study. Eur Child Adolesc Psychiatry. 2002;11:261–5.
7. Eapen V, Pauls DL, Robertson MM. Evidence for autosomal dominant transmission in Tourette's syndrome. United Kingdom cohort study. Br J Psychiatry. 1993;162:593–6.
8. Eapen V, Robertson MM, Alsobrook JP 2nd, Pauls DL. Obsessive compulsive symptoms in Gilles de la Tourette syndrome and obsessive compulsive disorder: differences by diagnosis and family history. Am J Med Genet. 1997;74:432–8.
9. George MS, Trimble MR, Ring HA, Sallee FR, Robertson MM. Obsessions in obsessive-compulsive disorder with and without Gilles de la Tourette's syndrome. Am J Psychiatry. 1993;150:93–7.
10. Cavanna AE, Monaco F, Mula M, Robertson MM, Critchley HD. Uneven focal shoe deterioration in Tourette syndrome. Neuropsychiatr Dis Treat. 2006;2:587–8.
11. Rothenberger A, Roessner V. The phenomenology of attention-deficit/hyperactivity disorder in Tourette syndrome. Tourette syndrome. New York: Oxford University Press; 2013.
12. Rizzo R, Curatolo P, Gulisano M, Virzi M, Arpino C, Robertson MM. Disentangling the effects of Tourette syndrome and attention deficit hyperactivity disorder on cognitive and behavioral phenotypes. Brain and Development. 2007;29:413–20.
13. Haddad AD, Umoh G, Bhatia V, Robertson MM. Adults with Tourette's syndrome with and without attention deficit hyperactivity disorder. Acta Psychiatr Scand. 2009;120:299–307.
14. Byler DL, Chan L, Lehman E, Brown AD, Ahmad S, Berlin C. Tourette syndrome: a general pediatrician's 35-year experience at a single center with follow-up in adulthood. Clin Pediatr (Phila). 2015;54:138–44.
15. Burd L, Freeman RD, Klug MG, Kerbeshian J. Tourette syndrome and learning disabilities. BMC Pediatr. 2005;5:34.
16. Baron-Cohen S, Scahill VL, Izaguirre J, Hornsey H, Robertson MM. The prevalence of Gilles de la Tourette syndrome in children and adolescents with autism: a large scale study. Psychol Med. 1999;29:1151–9.
17. Robertson MM. Mood disorders and Gilles de la Tourette's syndrome: an update on prevalence, etiology, comorbidity, clinical associations, and implications. J Psychosom Res. 2006;61:349–58.
18. Cavanna AE, Robertson MM, Critchley HD. Schizotypal personality traits in Gilles de la Tourette syndrome. Acta Neurol Scand. 2007;116:385–91.
19. Ghosh D, Rajan PV, Das D, Datta P, Rothner AD, Erenberg G. Headache in children with Tourette syndrome. J Pediatr. 2012;161:303–7. e6