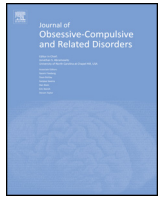




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Tourette syndrome and obsessive compulsive disorder: Compulsivity along the continuum

Clare M. Eddy^{a,b}, Andrea E. Cavanna^{a,b,c,d,*}

^a Department of Neuropsychiatry, Birmingham and Solihull Mental Health NHS Foundation Trust, The Barberry National Centre for Mental Health, Birmingham, UK

^b School of Clinical and Experimental Medicine, College of Medical and Dental Sciences, University of Birmingham, Birmingham, UK

^c School of Life and Health Sciences, Aston University, Birmingham, UK

^d Sobell Department of Motor Neuroscience and Movement Disorders, Institute of Neurology and University College London, London, UK

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ABSTRACT

The strong genetic link between obsessive compulsive disorder (OCD) and Tourette syndrome (TS) raises the possibility that obsessions and compulsions may comprise an alternative phenotypic expression of tics. Both of these disorders are characterised by repetitive behaviours (RB) involving recurrent thoughts and/or actions, often linked to dangerous or taboo themes, which present fairly early in life and tend to follow a chronic waxing and waning course. Over time many studies have attempted to disentangle the clinical profiles of these disorders. This article explores the key differences revealed by research over the last few decades, examining the types of RB expressed, patients' accompanying phenomenological experience (e.g. cognitive and sensory correlates), the proposed neural bases for each condition, and common interventions. Attempts to distinguish between OCD and TS based on the specific types of RB have often met with limitations. However, existing literature pertaining to the phenomenological experience of OCD and TS indicates that a number of factors may help differentiate these commonly associated conditions. Furthermore, differences in the psychological and physiological correlates of RB in TS and OCD are broadly in accordance with neuroimaging data. Study findings could offer insight into the predominance of TS diagnosis in males, age-related changes in diagnoses and the association between more context-dependent tic-like behaviours and OCD in patients with TS. Future studies should explore relationships between the cognitive, emotional and sensory aspects of RB and patients' demographical characteristics, neuropsychological test performance, and neural profiles.

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1. Introduction

1.1. Two disorders entwined

The medical community has long been aware of the likely etiological overlap between tics and obsessive compulsive symptoms. Tics, which are commonly preceded by sensory phenomena, and compulsions, which are commonly preceded by obsessions, appear phenomenologically similar. In the cases of Tourette syndrome, Gilles de la Tourette (1885) reported the presence of obsessive-compulsive behaviours. However, even at this time, these ritualistic compulsive actions were conceived as separable from the

repetitive, stereotyped, involuntary movements or vocalizations termed tics. Modern definitions of the psychiatric condition obsessive compulsive disorder (OCD) describe intrusive, ruminative thoughts which cause anxiety and distress and lead to compulsive repetitive behaviours which are reinforced by a reduction in anxiety. Tourette syndrome (TS) is most often classified as a neurodevelopmental condition involving movement disorder. Diagnosis of TS is based on the presence of multiple motor tics and at least one vocal tic simultaneously or at different periods during the illness, with tics lasting over one year.

1.2. Evidence for a genetic link

The lifetime prevalence rate of OCD in the general population is between 1.9 and 3.2% (Dinan, 1995). Interestingly, the proportion of individuals with TS who also have OCD is much higher, ranging from 28 to 63% (Grad et al., 1987; Robertson, Trimble & Lees, 1998; Pitman et al., 1987; Apter et al., 1993). An increased prevalence of

* Corresponding author at: Department of Neuropsychiatry, The Barberry National Centre for Mental Health, 25 Vincent Drive, Birmingham B15 2FG, UK. Tel.: +44 121 301 2280; fax: +44 121 301 2291.

E-mail addresses: andrea.cavanna@bsmhft.nhs.uk, cavanna77@libero.it (A.E. Cavanna).

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OCD is also reported in first-degree relatives of TS probands (Pauls & Leckman, 1986; Comings & Comings, 1987; Robertson et al., 1998), regardless of whether OCD is currently present in those probands (Pauls et al., 1986; Pauls, Raymond, Stevenson, & Leckman, 1991). In a twin study, Price, Kidd, Cohen, Pauls, and Leckman (1985) found that of 43 pairs of twins in which one twin had TS, OCD symptoms were apparent in 83% of individuals. These authors also reported a greater frequency of obsessive compulsive behaviours in monozygotic (52%) versus dizygotic (15%) twins. Genetic family studies have shown not only higher rates of obsessive-compulsive symptoms or OCD in relatives of individuals with TS, but also higher rates of tics or TS in first-degree relatives of patients with OCD (Pauls, Alsobrook, Goodman, Rasmussen, & Leckman, 1995; Grados et al., 2001; Rosario-Campos et al., 2005; Hanna, Fischer, Chadha, Himle, & Van Etten, 2005) in comparison to controls. The lifetime occurrence of tics in patients with OCD has been reported to be from 7 to 20% in children (Swedo, Rapoport, Leonard, Lenane, & Cheslow, 1989), while family studies of OCD probands indicated tics can occur in at least 17% of adult patients with OCD (Holzer et al., 1994). A more recent study revealed a genetic correlation between TS and OCD of 0.41 (Davis et al., 2013). The findings from this study were in line with previous heritability estimates for TS and OCD based on twin and family studies. The authors suggest that according to TS and OCD genome-wide complex trait analysis studies of common variation a very limited amount of heritability (if any) is truly missing. However, despite the significant genetic overlap between these disorders Davis et al. claim TS and OCD do have “distinct genetic architectures”.

Many authors agree that OCD is an integral part of and genetically related to TS (e.g. Pauls, Leckman, Towbin, Zahner, and Cohen, 1986; Cavanna, Servo, Monaco, & Robertson, 2009). Moreover, the above findings have prompted the suggestion that certain obsessive compulsive behaviours may form an alternative phenotypic expression of TS (Pauls et al., 1986; Eapen, Pauls & Robertson, 1993; Cavanna et al., 2011a). Some studies have therefore attempted to determine whether the form of OCD seen in patients with TS is likely to be more closely etiologically linked to OCD or to TS. For example, Coffey et al. (1998) tested 61 patients with TS, OCD, or TS plus OCD using the Structured Clinical Interview for DSM-III-R supplemented with additional modules. These three patient groups differed in the rates of numerous psychiatric disorders, namely bipolar disorder, social phobia, body dysmorphic disorder, attention deficit hyperactivity disorder and substance use disorder. Overall, these findings reflected elevated rates of the disorders in the TS plus OCD group compared with the TS and OCD groups. The authors claim that their findings are in line with the hypothesis that TS plus OCD is a more severe disorder than either TS or OCD, and may be more closely etiologically linked to TS than OCD.

1.3. Coinciding clinical profiles?

There are many similarities between the clinical profiles of OCD and TS. Both disorders follow a chronic waxing and waning course through the lifetime. Childhood or teenage onset is common in both, and although OCD may manifest later, an association is apparent such that a large proportion of children diagnosed with OCD also present with tics (e.g. Chabane et al., 2005). Genetic associations have been revealed in both conditions. Repetitive behaviours involving recurrent thoughts and/or actions (RB) are common in each, and these are considered by the patient to be at least in some respects, involuntary. These RB are commonly linked to dangerous or taboo themes, involving aggression, sex, or scatology. The symptoms of both OCD and TS can be exacerbated by stress or anxiety. There is also evidence that dysfunction of the

basal ganglia and related structures could be involved in both conditions (Coffey et al., 1998; Draganski et al., 2010).

Despite the many similarities between the symptoms of TS and OCD, there are of course some clear differences. For example, on closer examination, the course of the disorder can differ, as onset of tics is likely at a younger age than OCD symptoms (e.g. mean 7 versus early teenage years for OCD). Tic symptoms also appear overall more likely to improve with age, whereas in OCD symptoms often worsen over time (Ferrão, Miguel, & Stein, 2009). Cavanna and Rickards (2013) describe how the cognitive components of these disorders vary, such that OCD phenomena are usually accompanied by autonomic anxiety and by complex thought processes, whereas tics are usually preceded by short-lived sensory symptoms. Other differentiations include the ego-syntonic/-dystonic nature of the RB, perceived voluntariness and duration of the RB (Martino, Madhusudan, Zis, & Cavanna, 2013). Such differences have been the focus of investigation in many studies conducted over the last couple of decades. This article will briefly explore the key differences exposed by these studies within the broad domains of the types of RB expressed, patients' accompanying phenomenological experience (e.g. conscious awareness of RB and psychological and sensory features), the proposed neural bases for the condition, and approach to treatment.

2. Repetitive behaviours in Tourette syndrome and obsessive compulsive disorder

2.1. Symptom domains

A number of studies have explored the degree of overlap in terms of the types of RB expressed by patients with TS and OCD. As RB can be linked to recurrent thoughts, many studies have evaluated the most common obsessional themes as well as compulsive actions. Comparisons between TS and OCD have often been made by categorising symptoms into dimensions. Broadly, these dimensions tend to take aggressive, sexual, religious, contamination, ordering and arranging themes.

It has been suggested that intrusive aggressive or inappropriate sexual thoughts and images are more common in TS than OCD, whereas obsessions and compulsions in OCD only are more often related to fears about contamination or harm coming to another person (e.g. Frankel et al., 1986; Cavanna et al., 2006; Worbe et al., 2010). When comparing patients with TS+OCD to OCD only, studies have revealed more violent images and impulses, a fear of saying 'inappropriate' things, a need to know and remember, checking, counting, ordering, hoarding and touching RB in TS+OCD. For example, George, Trimble, Ring, Sallee, and Robertson (1993) found that patients with TS+OCD reported significantly more violent, sexual and symmetrical obsessions and more touching, blinking, counting, and self-injurious compulsions when compared to patients with OCD only. Other RB that seems to discriminate quite well between patients with OCD and TS include those linked to echophenomena, which are considerably more common when tics are present (Cath et al., 1992a; Cath, Wetering van de, Woerkom van, Roos & Rooijmans, 1992b; George et al., 1993; Holzer et al., 1994). On the other hand, OCD only is associated with more obsessions concerning dirt or germs, and more compulsions about cleaning (Leckman et al., 1994a; Holzer et al., 1994; Eapen, Robertson, Alsobrook, & Pauls, 1997). Mula, Cavanna, Critchley, Robertson, and Monaco (2008) compared the nature of the obsessional thoughts in TS+OCD versus temporal lobe epilepsy+OCD. Violent and symmetrical themes were most common in the first group, while fear of contamination and religious/philosophical ruminations were more frequent in the second.

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