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A review of co-occurrence of autism spectrum disorder and Tourette syndrome

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ABSTRACT

This paper reviews the co-occurrence of autism spectrum disorder (ASD) and Tourette syndrome (TS). ASD and TS are neurodevelopmental disorders with genetic etiologies that are more common in males and characterized by repetitive motor behaviors. However, they also have many differences, such as the age of onset or the functional use of stereotypies in ASD. This systematic review reveals that the co-occurrence of ASD and TS is around 4–5% and the co-occurrence of ASD and tic disorder (TD) ranges from 9–12%. The comorbidity prevalence rates vary according to the level of ASD severity (with comorbidity of high-functioning ASD and TS reaching 20%); the diagnostic processes; the sample size (smaller sample sizes produce higher prevalence rates); the recruitment setting (population or clinic-based); and the difficulty in practically and effectively distinguishing tics from stereotypies. The impact of the recent changes in the diagnostic criteria and definitions of both TS and ASD are discussed together with suggestions for further research. The clinical importance of examining comorbidity is emphasized.

Contents

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1. Introduction

Autism spectrum disorder (ASD), intellectual disability (ID), developmental coordination disorder (DCD), communication disorders affecting language, attention-deficit/hyperactivity disorder (ADHD), and tic disorders (TD) including Tourette syndrome (TS) form a group of disorders called ESSENCE (early symptomatic syndromes eliciting neurodevelopmental clinical examinations) (Gillberg, 2010). The similarity in clinical phenotypes makes the differentiation between these disorders quite difficult, particularly at the early stages of development. Differential diagnosis is achieved through the comparison of phenotypically similar groups of children with regard to both similarities and differences in variables that are thought to be somehow related to etiology, clinical presentation, response to treatment, or natural history. This differentiation is useful not only for nosology purposes, but it can provide valuable information for clinical management and possibly prevention (Gadow, De Vincent, & Schneider, 2009). Therefore, the aim of the present paper is to examine the co-occurrence of ASD and TS drawing on their similarities and differences, making suggestions for clinical practice, and highlighting the methodological limitations that should be addressed in future research.

1.1. Autism spectrum disorder

ASD represents a set of clinical phenotypes and constitutes an early-onset neurodevelopmental disorder that affects social communication, imagination, and behavior (Coleman & Gillberg, 2012; Waterhouse, 2013). The symptoms must be present in the early developmental period (although they may not become fully manifest until social demands exceed limited capacities, or may be masked by learned strategies in later life) and there are degrees of severity (American Psychiatric Association (APA), 2013). The prevalence of ASD has been increasing steadily in the past years and this is reflected in a recent report published in 2014 by the Centers for Disease Control and Prevention (CDC). It provides a prevalence estimate of 1 in 68 children (14.7 in 1000 children), which is increased by 30% in comparison to the CDC estimate of 2012. This could be explained by the more sensitive screening and diagnostic methods that have been developed and refined, as well as the increased efficiency of clinicians in identifying signs of ASD at younger ages.

The new Diagnostic and Statistical Manual-5 (DSM-5; American Psychiatric Association (APA), 2013) reflects a scientific consensus that four previously separate disorders are actually a single condition with different levels of symptom severity in two core domains. ASD now encompasses the previous DSM-IV-TR (American Psychiatric Association (APA), 2000) autistic disorder (autism), Asperger's disorder (AS), childhood disintegrative disorder, and pervasive developmental disorder (PDD) not otherwise specified. The ratio of boys to girls is five to one (used to be four to one) and the mean age of diagnosis is four (used to be six) with some cases being diagnosed prior to the age of two. Approximately half of the individuals diagnosed with ASD have average or above average intelligence in comparison to 30% that was estimated about a decade ago (CDC, 2014). Since all the studies reviewed here were conducted and published before the release of DSM-5, we have retained the term AS to refer to individuals with ASD requiring little or no support (severity level 1).

1.2. Tourette syndrome

TS is another neurodevelopmental disorder that shares common features with ASD. TS is characterized by both multiple motor tics and one or more vocal tics being present at some time during the illness, although not necessarily concurrently. A tic is defined as a sudden, rapid, recurrent, non-rhythmic motor movement or vocalization. Tics may wax and wane in frequency, but for a diagnosis of TS they must have persisted for more than one year since first tic onset and the onset must be before 18 years of age. Finally, tics should not be associated with substance use (e.g., cocaine) or a general medical condition (e.g., stroke, Huntington's disease, postviral encephalitis) (American Psychiatric Association (APA), 2013).

There are two basic differences in the criteria for TS diagnosis as described in DSM-5 (American Psychiatric Association (APA), 2013) and DSM-IV-TR (American Psychiatric Association (APA), 2000). The first differentiation is that the core definition of what constitutes a "tic" is altered by the elimination of the term "stereotyped". The revised definition applies consistently across all entities of tic disorders and this coincides with the conceptualization of tic disorders as a spectrum. The second major difference is the elimination of one of the diagnostic criteria—namely, the absence of a tics free interval more than three months during the last year from evaluation. This change simplifies and facilitates the diagnostic process, since it has been proven difficult and challenging to adhere to the maximum three-month tic-free interval in clinical practice (Plessen, 2013).

TS was previously considered a relatively rare disorder. However, an updated population-based cohort study published in 2015 by Mataix-Cols et al. (2015) revealed that TS is currently among the most heritable neuropsychiatric conditions. Moreover, a recent meta-analysis (Plessen, 2013) has estimated a prevalence of 1% in the general population, with more boys affected than girls (approximately three to five boys for one girl). Data from the 2011 to 2012 National Survey of Children's