

# DIAGNOSIS AND TREATMENT OF COMORBIDITIES OF TOURETTE'S SYNDROME AND BIPOLAR DISORDER IN A 10-YEAR-OLD BOY

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Changes in moods are one of the comorbid psychiatric manifestations that frequently occur in patients with Tourette's syndrome. The assessment of a manic episode in children with Tourette's syndrome is challenging. Furthermore, the treatment of children with comorbid mania and Tourette's syndrome has not been extensively studied. We present a 10-year-old boy who suffered from both Tourette's syndrome and mania, whose symptoms improved after using lithium and risperidone. The child was diagnosed with Tourette's syndrome at 7 years of age when he suffered from tics and experienced his first manic episode. He received monotherapy, including haloperidol, risperidone and aripiprazole, and the response was poor. When the combination of lithium and risperidone was used, the tics and mania subsided. It is important to assess individuals with Tourette's syndrome for associated bipolar disorder. The treatment of children with both disorders is a major clinical issue, and our case may serve as an example for successful treatment strategies.

**Key Words:** bipolar disorder, child, Tourette's syndrome  
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Tourette's syndrome consists of multiple motor tics and one or more phonic tics. It is a chronic neuropsychiatric disorder characterized by a waxing and waning course. Its onset is in childhood and the prevalence is 4–5 per 10,000 people [1]. Patients with Tourette's syndrome commonly show a wide range of co-occurring psychiatric and behavioral disorders, including attention-deficit hyperactivity disorder, obsessive-compulsive symptoms, anxiety and affective disorders [2].

Compared with Tourette's syndrome, which frequently occurs during childhood and adolescence, bipolar disorder is typically diagnosed during late adolescence or adulthood. A lifetime prevalence of 5.0% and a 12-month prevalence of 3.4% have been reported for DSM-IV (*Diagnostic and Statistical Manual of Mental Disorders*, 4<sup>th</sup> edition) bipolar spectrum disorder among 12–29-year-olds [3]. Mood swings and anger are some of the comorbid psychiatric manifestations that frequently occur in patients with Tourette's syndrome [4]. Although the sample sizes of previous studies have been small, and controversy surrounds the definition of mania in children and adolescents, the results suggest a relationship between Tourette's syndrome and bipolar disorder [2,5–8]. Comings and Comings reported a controlled study in which none of the patients without Tourette's syndrome had mania; however, 19.1% of the patients with Tourette's syndrome had comorbid mania [4]. Spencer et al also



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found higher rates of bipolar disorder in a group of children with chronic tic disorders (28%) than in those with Tourette's syndrome (13%) or in a healthy control group (0%) [9].

Emotional excitement and tension associated with interpersonal relationships that result from symptoms of mania may aggravate the symptoms of tics [10]. On the other hand, tics may result in serious social consequences and academic problems for the patient, which may precipitate or perpetuate the mania [11]. A vicious cycle may develop in patients with comorbid Tourette's syndrome and bipolar disorder, when neither of the disorders are managed by interventions. Classic manic episodes are uncommon in prepubescent children; however, prepubescent children exhibiting symptoms of mania often require hospitalization. Reviews of current therapeutic approaches have revealed several treatment options for patients with Tourette's syndrome [12]. Nevertheless, to the best of our knowledge, treatments for mania in children and adolescents have not been well studied, and research regarding the treatment of children and adolescents with comorbid mania and Tourette's syndrome has not been reported. In this case report, we describe the diagnostic process and successful therapeutic intervention used in a 10-year-old boy with comorbid Tourette's syndrome and bipolar disorder.

## **CASE PRESENTATION**

### ***Chief problems***

The patient was a 10-year and 7-month-old boy who was brought to the Department of Child and Adolescent Psychiatry of a mental hospital because of irritability, labile and euphoric mood, and violent behaviors observed 2 months before admission.

### ***Family history***

The patient lived with his parents and was the only child in his family. His father is a doctor and his mother is unemployed. There was no family history of tics. However, his uncle's son had been diagnosed with bipolar disorder.

### ***History of physical illness***

There was no history of head injury or infections of the central nervous system. The medical history of his birth and development were unremarkable.

### ***History of psychiatric illness***

Reviewing his medical history, he had normal developmental milestones. His premorbid personality was introverted and assiduous. There had been no difficulties in sustaining attention or controlling his behavior prior to this admission. No depressive or manic episodes were found. His performance at school was good. When he was 5 years old, involuntary protrusion of the tongue from the mouth developed, although it remitted spontaneously 1 month after it began. At the age of 7 years, he suffered from the same involuntary behavior and new involuntary movements, including shoulder shrugging, head flinging and teeth gnashing, developed subsequently. Vocal tics and grunting also emerged. Brain magnetic resonance imaging was performed at that time and revealed unremarkable findings. The tics were mitigated by haloperidol, but he could not tolerate the sedative effects of the treatment. Pergolide (0.5 mg/day) was used as a replacement, and the symptoms remitted for 1 year.

When he was 10 years old, he went to the 5<sup>th</sup> grade, where he met some new classmates. The tics began again, and irritability became more severe with time. In addition, the patient was increasingly absent from school and his school performance worsened. These problems were initially attributed to reactions to the interpersonal tension secondary to his tics. Pergolide was used to relieve the tics, but the response was poor. Amisulpride (200 mg/day), risperidone (2 mg/day) and haloperidol (1.125 mg/day) were also used as monotherapy to mitigate the tics. However, none of these monotherapies were effective. A combination of risperidone (2 mg/day) and clonidine (0.5 mg/day) was then given, but the symptoms did not improve substantially using this therapy.

At the same time, his parents noticed that his mood was not only irritable but also labile and euphoric. He jumped from the balcony of the second floor of the classroom building twice because he was angry at his classmates for paying attention to his tics. He thought that he would not get hurt by jumping from the second floor because he believed he had a "special power helping him". In fact, he suffered a lower leg fracture. Therefore, it was suggested that he receive inpatient care and he was admitted to the psychiatric ward of a medical center. Crisis intervention was done under the tentative diagnosis of Tourette's syndrome. Because of his poor responses to haloperidol, risperidone and clonidine, aripiprazole

(5 mg/day) was prescribed and the tics seemed to mildly improve during the 5 days of hospitalization. After discharge, he moved to a different classroom because of the poor relationships with the original classmates. However, his irritability, euphoria and aggressive behaviors did not subside, but instead became progressively more severe. He was readmitted due to the worsening conditions 1 month after the previous admission, and the dose of aripiprazole was increased to 15 mg/day. Because the irritability and euphoria did not improve, he was transferred to the Department of Child and Adolescent Psychiatry of a mental hospital for help and was admitted to the acute ward.

A manic episode was strongly suspected because of the sustained euphoria, expansive mood and irritability. To establish a differential diagnosis, we stopped all of the medications, except for clonazepam (2 mg/day), which was prescribed as a sleep aid. The patient's mood became more and more irritable and elevated, and he became more talkative than usual and had a decreased need for sleep. Goal-directed activities, such as social interactions, were increased. The manic symptoms persisted for more than 1 week under clonazepam therapy, and a manic state was diagnosed.

### ***Results of examination at this admission***

Awake-electroencephalography revealed no polyspike waves, and thyroid function was within reference range. The Wechsler Intelligence Scale for Children—Third Edition (WISC-III), which was done when the mania subsided, revealed his IQ to be 102, which was within the average range.

### ***Treatment***

Lithium was prescribed and the dosage gradually increased to 700 mg/day. Risperidone (2 mg/day) was prescribed simultaneously, but the manic and tic symptoms showed only mild improvements with these medications. Then, the dose of lithium was increased to 1,200 mg/day to increase the blood concentration level to 0.9 mmol/L, and the dose of risperidone was unchanged. The mood was less elevated about 1 week after starting the new treatment. The irritability and decreased need for sleep progressively remitted. At the same time, the tics also improved. No side-effects of these medications emerged during the admission or follow-up. He was discharged and he returned to school. He has been treated with lithium

(1,200 mg/day) and risperidone (2 mg/day) in the outpatient clinic for 6 months. No further manic symptoms developed with these medications. The severity of the tics did not worsen.

## **DISCUSSION**

The case described here illustrates the complex nature and treatment of a child with comorbid Tourette's syndrome and bipolar disorder. Until now, the relationship between Tourette's syndrome and bipolar disorder has remained unclear. Kerbeshian et al reported that the 16q22-23 region should be considered as a candidate region for primary or modifying genetic factors resulting in the phenotypes of Tourette's syndrome and bipolar disorder [13]. It has also been proposed that a gene leading to the expression of Tourette's syndrome may represent a locus for bipolar disorder [14]. Although the locus proposed by Comings and Comings has not been supported by further studies [4], the general concept may have merit. Both Tourette's syndrome and bipolar disorder appear to share a number of neurophysiological characteristics, including abnormalities in noradrenergic, dopaminergic, and serotonergic neurotransmission [2]. More research is needed to elucidate why bipolar disorder may be overrepresented in patients with Tourette's syndrome. On a more practical level, clinicians should be alert to the possible coexistence of Tourette's syndrome and bipolar disorder. This may have significant implications for effective treatment, such as the need for hospitalization.

The assessment of manic symptoms in a child with Tourette's syndrome is challenging. The distress resulting from the tics may make children irritable, impulsive and agitated. Symptoms of mania may also include irritability, impulsiveness and psychomotor agitation. This explains why it is difficult to assess manic symptoms in a child with Tourette's syndrome. Leibenluft et al [15] suggested that clinicians are able to confirm the diagnosis of mania in juvenile patients when euphoria, grandiosity, a decreased need for sleep or increased goal-directed activities are identified because these symptoms are specific to the diagnosis of mania but not to Tourette's syndrome. The present case suffered from euphoria, grandiosity, a decreased need for sleep and increased goal-directed activities on days without psychotropic medications.

The manic episode lasted for more than 1 week; therefore, the symptoms were consistent with the diagnosis of mania.

Several researchers have reported on many kinds of treatments for tics, including pharmacotherapy and non-pharmacotherapy [16–18]. Treatments for comorbid conditions are also important to mitigate tics. However, treatments for mania in children and adolescents have not been well studied, and there have been few studies on the treatment of Tourette's syndrome and mania. Kerbeshian et al reported that the frequency and intensity of motor and vocal tics was mood-dependent, with exacerbations during the presence of manic symptoms [13]. Therefore, it would be ineffective to treat the tics only and not the mania, or, if the treatments were only focused on mania, the conditions might not be completely relieved.

Aripiprazole was reported to be effective in treating Tourette's syndrome and mania [19,20]. However, our patient received 15 mg/day of aripiprazole but neither his tics nor manic symptoms were relieved. Our patient was then given the combined treatment of lithium and risperidone, which simultaneously relieved the symptoms of tics and mania, and interrupted the vicious cycle between mania and Tourette's syndrome.

Our patient did not experience obvious side effects of lithium or risperidone. Lithium is approved by the United States of America Food and Drug Administration to treat individuals with acute mania aged 12 years or above, whereas risperidone is approved for adult mania. Further investigations are needed on the use of lithium and risperidone in the treatment of children with bipolar disorder and Tourette's syndrome. Our case offers an example for children with both diseases. The safety and drug-related side-effects should be closely monitored because they have not been well studied in children.

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# 診斷及治療妥瑞氏症合併雙極性情緒疾病的 十歲男孩 — 病例報告

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情緒症狀是妥瑞氏症個案常伴隨的問題之一，因此，在這些個案中評估是否有躁症發作，深具挑戰性，而治療同時有躁症及妥瑞氏症的兒童也尚未被詳細研究。以下報告一個年紀 10 歲而同時有妥瑞氏症及躁症、經 **lithium** 及 **risperidone** 治療成功的個案。個案 7 歲時被診斷為妥瑞氏症，在 10 歲時遭遇第一次躁症發作且合併有妥瑞氏症。個案曾接受過 **haloperidol**，**risperidone** 及 **aripiprazole** 等單一藥物治療，但效果不佳，在合併 **lithium** 及 **risperidone** 治療下，其臨床症狀有明顯改善。評估妥瑞氏症患者中是否有合併躁鬱症具有重要性，而如何處理同時有躁鬱症及妥瑞氏症的兒童，是臨床上的重要議題。我們提出的報告可做為未來持續研究的基礎。

關鍵詞：雙極性情緒疾病，兒童，妥瑞氏症  
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