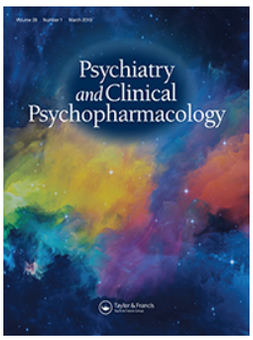

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CASE REPORT

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# Tic disorder developing following risperidone in a child with oppositional defiant disorder

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**ABSTRACT**

Oppositional defiant disorder (ODD), one of the psychiatric disorders frequently encountered in childhood, is a disruptive behaviour disorder involving emotional and behavioural problems. Children with ODD may experience difficulty in controlling anger and are generally disobedient and defiant of other people. Risperidone, an atypical antipsychotic agent is a dopamine and serotonin 2A receptor antagonist, is used in the treatment of disruptive behavioural disorders in which aggressive or other disruptive behaviours predominate (aggressive symptoms, self-harm, anger episodes, sudden mood changes, etc.). We discuss a case of tic disorder developing following risperidone use during treatment of a child diagnosed with ODD.

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**KEYWORDS**
Tic disorders; risperidone; antipsychotics; safety; side effects

## Introduction

Oppositional defiant disorder (ODD) is defined as persistence for at least six months of four out of eight symptoms in three categories consisting of angry/irritable mood, argumentative/defiant behaviour and vindictiveness. It is classified among the disruptive behaviour disorders. Disruptive behaviour disorders constitute a group of psychological problems involving conduct disorder, oppositional defiant disorder and disruptive behaviour disorder not otherwise specified [1]. The main difficulties encountered in disruptive behaviour disorders are aggression and willfulness. Disruptive behaviours are often treated with off-label use of various medications designed for other conditions, such as psychostimulant drugs, mood regulators and antipsychotics [2]. Previous research data have shown that risperidone improves symptoms in children with ODD and is effective against aggressive behaviour [3,4]. Tic disorder is a neuropsychiatric disease characterized by the presence of sudden and repeated involuntary movements or vocalizations, with varying degrees of intensity and frequency and with an unpredictable course. Tics have been linked to basal ganglion anomalies and particularly to functional impairment of striatal GABAergic networks and excessive striatal dopamine [5]. Although the aetiology of tic disorder is unclear, while genetic and environmental causes are capable of causing them, tic disorders may also appear as a side-effect of some drugs [6,7]. We present a case of tic disorder developing following risperidone use during treatment of a child diagnosed with ODD. The family provided written consent for the publication of this report.

## Case presentation

A boy aged five years and six months was brought to our clinic by his family. He was the younger of two siblings, and had an eight-year-old sister. He attended nursery class and lived with his mother, father and sister. Reasons for presentation were irritability, defiance, hitting children at school, failure to obey rules, constantly responding in the negative and behaving in such a way as to anger his parents. The existing symptoms had been present for more than a year. Similar symptoms were present at the school where he was in the nursery class, and he experienced problems in peer relations. He defied his teacher, was unwilling to do as he was told and reacted angrily to prohibitions. The family reported that he frequently refused to comply with the wishes or rules of adults with whom he argued outside school and the home. Developmental milestones were reached on time. Intelligence and understanding were appropriate for his age. He had no history of hospitalization, seizure, surgery or systemic disease. There was no consanguinity between the parents and no known family history of disease. ODD was diagnosed at psychiatric assessment based on DSM-V. No other psychiatric disease that might accompany the existing ODD was determined. The family was given counselling concerning child education following the diagnostic process. The patient

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was started on psychotherapy and pharmacotherapy with family–school cooperation and supervision. Risperidone was initiated at 0.5 mg. At follow-up two weeks later, we learned that he was more compliant and had no problems in school, but that tics in the form of repetitive blinking and throat-clearing had begun after starting the medication. Risperidone was discontinued, and follow-up in two weeks' time was advised. At subsequent interviews, we learned that the tics had disappeared once the medication had been discontinued and that his behavioural problems had reoccurred. The patient was again started on risperidone, and the same tics were again observed. Risperidone was stopped, and the patient was started on aripiprazole 3 mg. After starting on aripiprazole, the patient's behavioural problems decreased and no further tics were observed. Complaints from the school also decreased.

## Discussion

Antipsychotic use is a common pharmacological treatment option for tic disorder. It has been suggested that tic disorder has a pathophysiology involving dopamine receptor hypersensitivity. Interaction of cholinergic, GABAergic and serotonergic systems may also be involved in this mechanism. Atypical antipsychotics are thought to be capable of increasing dopaminergic function and exacerbating tic-like symptoms as a result of mechanisms such as relatively low dopamine D2 receptor occupancy and 5-HT2 blocker effects that can lead to dopamine release. Patients have been reported to develop tics after the use of paliperidone, the main active metabolite of risperidone [8]. Risperidone may increase dopamine release by the serotonin 5-HT2A blocking effect in the presynaptic receptor. The release of dopamine may exacerbate tics in the tic-associated neuropathway. Tic-like behaviour caused by risperidone in an adult patient was treated with aripiprazole [9]. Lin et al. reported a case of a 15-year-old female schizophrenia patient who developed frequent involuntary eye-blinking movements after amisulpride therapy [10]. Similarly, Chen et al. reported a case of tic disorder following quetiapine therapy with a diagnosis of bipolar disorder [11]. Another recent study reported tic disorder developing in a patient started on aripiprazole with a diagnosis of schizophrenia [7]. There are known variants of dopamine receptors. Cerebral imaging and postmortem receptor binding studies have revealed a lower concentration of D2 receptors in the basal ganglia of bearers of the TaqIA A1 allele [12]. We also suspected that a genetic mechanism might have caused an outcome capable of accounting for the condition of our patient. Relative hyperactivity or hypersensitivity of the dopamine system emerging with the use of antipsychotic drugs is thought to be a potential physiological mechanism for tics [13]. Studies have shown that various mechanisms, such as dopamine receptor sensitivity, genetic variants and 5HT2 blockage can give rise to tic development after antipsychotic use. Several studies have shown that risperidone is effective in the treatment of tic disorders. However, there have been no previous reports of tic disorder occurring during risperidone therapy in children. Aripiprazole is useful in patients with tics developing after risperidone use. Clinicians should be alert to this rare but potentially serious side-effect after prescribing risperidone. Our case and those cited above show that risperidone, like other antipsychotics, may cause tics to develop during treatment. Antipsychotics are used in the treatment of various diseases. The possibility of an association between these drugs and new or exacerbated repeated involuntary movements should be considered in case of antipsychotic use. The monitoring and control of such side-effects will have a positive effect on patient treatment compliance and therapeutic outcomes.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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