Case Report

Methylphenidate Induced Stereotypic (Dyskinetic) Movement Disorder in A Child with ADHD and IDD: A Rare Adverse Drug Reaction

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ABSTRACT

Methylphenidate is known to be the standard of care for the initial pharmacological management of Attention Deficit Hyperactivity Disorder (ADHD) in both adult and pediatric populations. Common adverse effects include cardiovascular symptoms, exacerbation of psychotic features, loss of appetite, abdominal pain, and sleep disturbances. We describe a case of a 4-year-old female diagnosed with ADHD and Intellectual Developmental Delay (IDD) who developed repetitive hand movements two days after initiating methylphenidate therapy. The symptoms were consistent with a methylphenidate-induced movement disorder. This reaction is rare and is believed to occur due to stimulant-induced dopaminergic hyperactivity in the brain. Psychostimulants are known to cause various movement disorders, including tics, chorea, dyskinesia, stereotypies, and parkinsonism. Patients with comorbid conditions, neurodevelopmental disorders, or a history of epilepsy may be at higher risk of developing such adverse drug reactions (ADRs). This case demonstrates the critical need for careful monitoring when prescribing stimulants, especially in patients with neurodevelopmental comorbidities. Clinical pharmacists play a pivotal role through medication chart review, effective patient counselling, prompt ADR assessment, management, and reporting.

Keywords: Methylphenidate, Stereotypic movement, Neurodevelopmental disorder, Dyskinesia, Psychostimulant.

INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is a prevalent neurodevelopmental disorder observed across various populations, including children, adolescents, and adults, with an estimated prevalence of approximately 4–12% and 5% respectively. In clinical practice patient care strategy for ADHD often involves multi-tiered approach incorporating Psychoeducation, Cognitive behavioral therapy and Pharmacotherapy.[1,2]

Among pharmacological options, psychostimulants such as methylphenidate are considered the drugs of choice for the pediatric population.[3,4] The therapeutic efficacy of methylphenidate is attributed to its influence on brain neurotransmitters, particularly through modulation of dopamine release and reuptake in the prefrontal cortex and striatum. It significantly increases extracellular dopamine concentrations by inhibiting the human dopamine transporter.[4,5]

Common adverse effects of methylphenidate include cardiovascular symptoms and an increased risk of psychotic episodes, particularly in patients with comorbid psychiatric or substance use disorders.[3] Other frequently reported side effects are loss of appetite, gastrointestinal disturbances, sleep disruption, rashes and other dermatological reactions.[6,7] In rare instances, stimulant medications can induce uncommon movement disorders such as tics, stereotypies, chorea, dyskinesia, and occasionally, parkinsonism.[1]

CASE PRESENTATION

A 4-year-old female child presented to the Department of Psychiatry with complaints of repetitive hand movements that developed two days after initiation of Methylphenidate (Tab. Inspiral) 10 mg once daily. The child had a known history of Attention Deficit Hyperactivity Disorder (ADHD), severe Intellectual Developmental Delay (IDD), and absence seizures.

According to the guardians, the child had previously exhibited multiple developmental concerns. From around 1 year of age, she was noted to have poor postural control, inability to sit without support, reduced eye contact and social interaction, and inattentiveness during play. She often appeared restless and irritable, with episodes of biting others, throwing objects, and showing unusual behaviours such as eating own stool and drinking dirty water. The child had not yet attained bowel and bladder control.

Prior to the current episode, she was evaluated by a pediatrician for episodes of staring spells lasting 5–10 minutes, after which she would resume her normal activities. These episodes were diagnosed as absence seizures, for which antiepileptic therapy was initiated. Two days after starting methylphenidate, the parents observed repetitive purposeless hand movements and brief episodes of unresponsiveness, prompting a revisit to the outpatient department for further evaluations.

Past Medical History

In March 2025, the patient was diagnosed through IQ assessment as having severe Intellectual Developmental Delay (IDD). She was started on Tab. Arkamin 0.1 mg (¼–0–¼) and Tab. Arip MT (Aripiprazole) 2.5 mg (0–0–1), which resulted in approximately 20–30% improvement in behavioral symptoms over 20 days.

In April 2025, the patient developed drowsiness. The same medications were continued, but the Tab Arkamin dose was modified to ¼–¼–½, and Syrup Cognisense 2.5 mL (1–0–1) was added.

In May 2025, the child presented with continued hyperactive and socially inappropriate behaviours such as playing in dirty water, showing about 10% overall improvement. The medications were continued, but Tab. Arkamin was increased to ½–½–½, and Tab. Sizodon 0.5 mg (1–0–1) was added.

By June 2025, there was approximately 25% improvement, and the same regimen was maintained. On August 1, 2025, the child was brought to the outpatient department with abnormal behaviour for the past 15 days, including eating non-edible substances. At this visit, Tab. Arkamin was increased to 1–½–½, and Tab. Sizodon was increased to 1 mg (½–0–1). In addition, Tab. Inspiral 10 mg (1–0–0) and Tab. Parkin 2 mg (1–0–0) were started, along with continued Syrup Cognisense 2.5 mL (1–0–1).

On August 6, 2025, the child revisited the OPD with repetitive hand movements that appeared two days after starting methylphenidate. On general examination, the child was conscious, crying, and afebrile, with pulse rate 96 bpm and respiratory rate 16 cpm. Systemic examination revealed no abnormalities in the cardiovascular, respiratory, or abdominal systems. Neurological assessment showed that the child was conscious but orientation and higher mental functions could not be evaluated, as she did not respond to verbal commands. MRI Brain (plain) revealed no significant parenchymal abnormality. Based on clinical presentation, temporal relationship, and supporting evidence, the case was diagnosed as ADHD with severe IDD presenting with a rare adverse drug reaction—methylphenidate-induced movement disorder (stereotypic movements with transient loss of consciousness).

The patient's current medications include:

Tab. SIZODON (Risperidone) 1 mg (½–0–1)

Tab. PARKIN (Trihexyphenidyl) 2 mg (1–0–0)

Tab. ARKAMIN (Clonidine) 0.1 mg (½–½–½)

Syrup COGNISENSE (L-Carnosine) 2.5ml (1–0–1)

Tab INSPIRAL (Methylphenidate) 10mg (1-0-0) - withdrawn

DISCUSSION

In this case, the patient developed repetitive hand movements within two days of initiating methylphenidate, suggesting possible dopaminergic overactivity as the underlying cause. The commonly observed ADHD symptoms in this child included behavioral disturbances, inattentiveness, restlessness, reduced social interaction, and eating non-edible substances. The onset of new repetitive hand movements following methylphenidate initiation, along with their resolution after drug withdrawal, supports a strong causal relationship indicating a rare drug-induced movement disorder.

Comorbid conditions such as epilepsy and neurodevelopmental disorders (e.g., intellectual developmental delay) may increase susceptibility to stimulant-induced movement disorders, as documented in similar reports.[8]

The proposed mechanism involves overactivity of dopaminergic pathways along with underactivity of cholinergic and GABAergic systems, leading to dysfunction in the cortico-striato-thalamo-cortical circuit. Additionally, hypersensitization of dopamine D_2 receptors due to prolonged dopaminergic stimulation or prior exposure to dopamine receptor blockers may contribute to the manifestation of such abnormal movements.[1,9]

Stimulant-induced movement disorders encompass a range of manifestations such as tics (sudden, irregular, repetitive motor or vocal movements), stereotypies (rhythmic, purposeless, involuntary movements), chorea (dance-like irregular muscle contractions), and parkinsonian features (tremor, bradykinesia, rigidity).[1] Among these, dyskinesia and stereotypies are more prominently associated with methylphenidate therapy. Tardive dyskinesia typically involves the orolingual region, characterized by lip-smacking, chewing, or tongue movements. In contrast, tardive stereotypy involves repetitive movements of other body parts, such as the limbs, which aligns with the presentation seen in this pediatric case.[10, 11]

Several drugs have been implicated in causing such adverse reactions, including morphine, disulfiram, levodopa, neuroleptics, amphetamines, bupropion, methylphenidate, and anticholinergics. This case provides strong evidence supporting the diagnosis of methylphenidate induced stereotypic movement disorder in this patient.[9]

In this case, symptoms were effectively managed by withdrawing methylphenidate from the therapeutic regimen. In general, management of stimulant-induced movement disorders includes dose tapering or discontinuation of the offending agent. Pharmacological options for tardive dyskinesia and tardive stereotypies include vesicular monoamine transporter-2 (VMAT2) inhibitors, which reduce the presynaptic storage and release of dopamine, thereby alleviating symptoms.[9]

CONCLUSION

This case highlights a rare stimulant (methylphenidate)-induced movement disorder in a pediatric patient. It emphasizes the need for careful consideration and precautions when prescribing stimulant therapy in children,

especially those with comorbid conditions such as epilepsy or neurodevelopmental disorders that increase dopaminergic overactivity. Clinical pharmacists play a vital role in ensuring safe, appropriate, and individualized therapy through effective communication with healthcare professionals and caregivers, ADR monitoring, and causality assessment. Strengthening pharmacovigilance practices through systematic ADR reporting and documentation are vital for recognizing rare adverse drug reactions and contributing key evidence for future reference.

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