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LETTER TO THE EDITOR

Tic disorder possibly related to the duration of action of short-acting methylphenidate in a seven-year-old child with attention deficit hyperactivity disorder and intellectual disability

Dikkat eksikliği hiperaktivite bozukluğu ve zihinsel yetersizliği olan yedi yaşında bir çocukta muhtemelen kısa etkili metilfenidatın etki süresiyle ilişkili tik bozukluğu

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To the Editor,

Attention Deficit Hyperactivity Disorder (ADHD) is known to be seen more frequently in children diagnosed with intellectual disability than in children with normal development[1,2]. Methylphenidate is a psychostimulant drug that is widely used in the treatment of ADHD[3,4,5]. Recent randomized studies have reported that the use of methylphenidate is not associated with new onset or worsening of tics[5,6]. However, studies on the effects of methylphenidate use in children with mental retardation are limited[3,4]. The case is here presented of a 7-year-old male patient with borderline intellectual disability, who developed new-onset tics most likely due to methylphenidate treatment and whose tics subsided when the methylphenidate was discontinued and its effects subsided.

A 7-year-old male patient, who was followed up due to borderline developmental delay, presented at our clinic with the complaints of poor academic performance, and inability to focus on lessons and household chores. The patient had no family history of medical pathology and was followed up due to gait instability in his medical history. An MRI performed two years previously revealed an appearance of mega cisterna magna, and other formations were normal. The psychometric evaluation of the patient with the Wechsler Intelligence Scale for Children (WISC-R) detected borderline intellectual disability (IQ=72). According to the psychiatric examination based on DSM-5 criteria, the patient was diagnosed with borderline intellectual disability and ADHD (Clinical Global Impressions-Severity subscale = 5). The neurology and cardiology consultations did not determine any additional pathologies that would prevent the initiation of medical treatment. The patient was prescribed 5 mg short-acting methylphenidate for ADHD.

At two-weeks follow-up, the patient's parents notified that they noticed repetitive motor movements on the patient's face about 30-45 minutes after using short-acting methylphenidate. They described that the severity of these movements increased within an hour, and the severity and frequency of motor movements decreased within 2-3 hours and this situation repeated in the same manner every time methylphenidate was used. The patient had no family history of tic disorder, no clinical history of tics, and developed no other side-effects from using methylphenidate.

Subsequently, the patient was reconsulted with the Neurology Department. The brain MRI results were consistent with the results of the MRI performed two years previously, and diffusion MRI did not exhibit any regions of abnormal diffusion restriction in the cerebral and cerebellar hemispheres. The EEG examination did not reveal any pathology.

Although the patient benefited from medical treatment (Clinical Global Impressions-Severity

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subscale = 2), the parents reported that they wanted to discontinue medical treatment due to the tics that occurred while the drug was in effect. Informed consent was received from the child and the parents for this study publication.

In this case, short-acting methylphenidate treatment was prescribed in a patient diagnosed with borderline developmental delay who had no previous history of tics. It is most likely that the tics emerged with the onset of the effects of short-acting methylphenidate, the condition was seen to continue while the short-acting methylphenidate was in effect, and it was then observed that the tics subsided and disappeared possibly as the effects of short-acting methylphenidate decreased. According to the literature, there are certain significant biological reasons supporting that psychostimulants such as methylphenidate may increase tic severity. A rat model study suggested that methylphenidate may cause stereotyped behavior patterns in a dose-dependent manner[7,8] and these stereotyped behavior patterns induced by psychostimulants constituted the animal model of tic disorder[9].

It has also been reported that one of these pathophysiological mechanisms is that methylphenidate inhibits dopamine reuptake by presynaptic neurons by blocking the dopamine transporter (DAT), thereby increasing dopamine release in the synaptic space[10]. Furthermore, one of the proposed pathophysiological mechanisms for tics is increased dopaminergic activity in the basal ganglia, suggesting that DAT blockers may cause or exacerbate tics[11].

To the best of our knowledge, this is the first case report demonstrating that tics occurred particularly during the period of drug action, that tics would disappear when the drug's effect expired, and the same effects were observed every time short-acting methylphenidate treatment was administered to a young child with borderline intellectual disability and ADHD who had no family history or clinical history of tic disorders. However, studies on the side-effects of methylphenidate use in children with intellectual disability are limited in the literature[3]. This case report supports that the use of methylphenidate may be associated with the development of tic disorder in children with intellectual disabilities. Further studies are needed to evaluate the side-effects of methylphenidate in these patients.

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