

# Methylphenidate Induced Psychotic Symptoms: Two Cases Report

Selma Tural Hesapcioglu<sup>a, d</sup>, Zeynep Goker<sup>b</sup>, Cilem Bilginer<sup>c</sup>, Sema Kandil<sup>c</sup>

## Abstract

Methylphenidate is a central nervous system stimulant used as the first choice for treating the attention deficit hyperactivity disorder (ADHD). Methylphenidate could rarely cause psychotic symptoms even in with therapeutic doses. In this article, two cases were reported who diagnosed with ADHD, and shortly after the beginning of the long-acting methylphenidate treatment psychotic symptoms has emerged, and was discussed the treatment process of the psychotic symptoms.

**Keywords:** ADHD; Methylphenidate; Psychotic symptoms

## Introduction

Methylphenidate is a central nervous system stimulant which using as the first choice for treating the attention deficit hyperactivity disorder (ADHD) [1]. It causes an increase in striatal dopamin signalling by holding dopamine more in synaptic cleft via dopamin transporter blockage and D1 receptor activation in postsynaptic neuron [2]. It has been reported that methylphenidate could rarely cause visual hallucinations, paranoid, somatic or reference delusions in with therapeutic doses [3-7].

The emergence of hallucinations has been attributed to a chronic increase at dopamin levels in synaptic cleft while

the pathophysiological mechanisms are not clearly known. In some cases, hallucinations emerged after taking the first and low dose medication has been thought an effect of idiosyncratic mechanism [5].

Stimulants cause an increase of the releasing of catecholamines and a blockage of their getting back. Some authors argues that high dose stimulants can deteriorate the response to the visual stimuli causing different perception of the visual stimuli in susceptible children, based on the information that norepinephrine is released in the lateral geniculate nucleus, and it increases the transmission of visual information [5, 8].

In this article, two cases were reported who diagnosed with ADHD, and shortly after the beginning of the long-acting metylphenidate treatment psychotic symptoms has emerged, and was discussed the treatment process of the psychotic symptoms.

## Case Report

### Case 1

A girl, 10 years of age, had irritability, nervousness, non-compliance complaints for school, inattention, often finding excuses during the lessons. Sometimes suicidal thoughts, struggling in relationships with her mother. She had lost her father when she was 2 years old. Mother described that it is hard to get along with her for childhood period. Weschler Intelligence Scale for Children (WISC-R) verbal score was 107, performance score was 120, total intelligence score was 114. In history there was no any psychotic symptom, no existence in any psychotic symptom or disorder in her family. Attention deficit hyperactivity disorder plus generalised anxiety disorder plus oppositional defiant disorder was diagnosed with the Kiddie-schedule for affective disorders and schizophrenia - present and lifetime version-Turkish version (K-SADS-PL-T) [9] and treated with long-acting methylphenidate 36 mg per day. With the first day of the treatment, the thought which chased by a man continuously who saw him and came eye to eye for just one second with him in a market, watched via a candid camera by him when she was in her home, he wants to harm. During the two weeks pe-

Manuscript accepted for publication October 23, 2012

<sup>a</sup>Mus Obstetrics and Gynecology and Child Disorders Hospital, Child and Adolescent Psychiatry Clinic, Mus, Turkey

<sup>b</sup>Ankara Child Health and Disorders Hematology and Oncology Training and Education Hospital, Child and Adolescent Psychiatry Outpatient Clinic, Ankara, Turkey

<sup>c</sup>Child and Adolescent Psychiatry Department, Karadeniz Technical University Medical Faculty, Trabzon, Turkey

<sup>d</sup>Corresponding author: Selma Tural Hesapcioglu Mus Obstetrics and Gynecology and Child Disorders Hospital, Child and Adolescent Psychiatry Clinic, Mus, Turkey. Email: selmahesapcioglu@yahoo.com

doi: <http://dx.doi.org/10.4021/jmc923w>

riod, although had never seen a more, when she was walking she was looking at behind frequently. The evaluation of the Naranjo adverse drug reaction (ADR) probability scale [10] was 8. This symptom was evaluated as an adverse effect of methylphenidate. Methylphenidate were discontinued and began the atomoxetine and it was gradually increased. One week later, the delusion disappeared.

## Case 2

A boy, 7.5 years of age, first grade student. While he was taking the first school again he still could not literary. He was hyperactive and fightfull and highly talkative. St Binet IQ was 85. He had never psychotic symptom, there was no family history regarding any psychotic symptom or disorder. DSM-IV [11] criteria it was diagnosed attention deficit hyperactivity disorder and conduct disorder and was began long-acted methylphenidate 18 mg per day treatment. With first dose, the fear which he can be able to harm himself was began. He was seeing the objects as larger-than-life, and also big flies. He has been timid. He was talking to himself, was doing meaningless gesture as if there someone was in the face of him. ADR probability scale score was 7. At the 4th day of after the discontinuation, the fears disappeared. Family did not accept another medication.

## Discussion

Both cases have complicated ADHD. In both, long-acted methylphenidate treatment [12] were discontinued because it has caused the psychotic symptoms and after discontinuation, symptoms disappeared in a few days.

During the progress of ADHD, bipolar affective disorder or other psychiatric disorders can emerge as comorbid situation [13]. In both cases, comorbid disorder diagnosis was excluded because of the psychotic symptoms has immediately appeared after the methylphenidate treatment and disappeared after discontinuation of it.

Ross showed that the prevalence of the psychotic or manic symptoms emerging after stimulant treatment was 0.25% (or a four hundredth) while some methodological problems. But, it has been argued that reports are insufficient [14].

Kraemer et al. reported that 3 adult cases who had methylphenidate-induced psychotic disorder. After discontinuation and beginning the antipsychotic treatment, all of three patients' symptoms disappeared [6]. Kraemer et al. argued that the less frequency of psychotic adverse effects due to methylphenidate is stem from the ignorence of this effect by science [6]. In the literature, it has been adressed that the paranoid psychosis can emerge during the treatment of narcolepsia with methylphenidate [6] and it might be possible that the psychotic symptoms can occur because of the abuse

of the methylphenidate [15]. In our country, a case emerging visual hallucination after the beginning the methylphenidate and fluoxetine treatment has been reported by Abali ve Mukaddes, in 2007 [16].

Psychotic symptoms emerging after using the methylphenidate treatment is not very frequent and after discontinuation, it can immediately disappear. But this situation, sometimes can be fearful for family and it might be harmful for patient's compliance to the medication. For all these reasons, clinicians should be aware of psychotic symptoms during the methylphenidate treatment of patient with ADHD, before thinking the any comorbid disorder, clinician should evaluate the methylphenidate adverse effect. Thus, it would gain to clinician the right way of the effective treatment.

## Conflict of Interests

Authors have declared that there is not any conflict of interests.

## References

1. Taylor E, Dopfner M, Sergeant J, Asherson P, Banaschewski T, Buitelaar J, Coghill D, et al. European clinical guidelines for hyperkinetic disorder -- first upgrade. *Eur Child Adolesc Psychiatry*. 2004;13(Suppl 1):17-30.
2. Wilens T, Pelham W, Stein M, Conners CK, Abikoff H, Atkins M, August G, et al. ADHD treatment with once-daily OROS methylphenidate: interim 12-month results from a long-term open-label study. *J Am Acad Child Adolesc Psychiatry*. 2003;42(4):424-433.
3. Calello DP, Osterhoudt KC. Acute psychosis associated with therapeutic use of dextroamphetamine. *Pediatrics*. 2004;113(5):1466.
4. Cherland E, Fitzpatrick R. Psychotic side effects of psychostimulants: a 5-year review. *Can J Psychiatry*. 1999;44(8):811-813.
5. Porfirio MC, Giana G, Giovinazzo S, Curatolo P. Methylphenidate-induced visual hallucinations. *Neuropediatrics*. 2011;42(1):30-31.
6. Kraemer M, Uekermann J, Wiltfang J, Kis B. Methylphenidate-induced psychosis in adult attention-deficit/hyperactivity disorder: report of 3 new cases and review of the literature. *Clin Neuropharmacol*. 2010;33(4):204-206.
7. Halevy A, Shuper A. Methylphenidate induction of complex visual hallucinations. *J Child Neurol*. 2009;24(8):1005-1007.
8. Young JG. Methylphenidate-induced hallucinosis: case histories and possible mechanisms of action. *J Dev Behav Pediatr*. 1981;2(2):35-38.
9. Gokler B, Unal F, Pehlivanurk B, Kultur-Cengel E,

- Akdemir D, Taner Y. Okul cagi cocuklari icin duygulanim bozukluklari ve sizofreni gorusme cizelgesi-simdi ve yasam boyu sekli-Tuukce uyarlamasinin gecerlik ve guvenirligi. *Cocuk ve Genclik Ruh Sagligi Dergisi*. 2004;11: 109-116.
10. Naranjo CA, Busto U, Sellers EM, Sandor P, Ruiz I, Roberts EA, Janecek E, et al. A method for estimating the probability of adverse drug reactions. *Clin Pharmacol Ther*. 1981;30(2):239-245.
  11. American Psychiatric Association. *Diagnostic and statistical manual of mental disorders* (4th edition, text revised). 2000. Washington, DC.
  12. Marquand AF, De Simoni S, O'Daly OG, Williams SC, Mourao-Miranda J, Mehta MA. Pattern classification of working memory networks reveals differential effects of methylphenidate, atomoxetine, and placebo in healthy volunteers. *Neuropsychopharmacology*. 2011;36(6):1237-1247.
  13. Wilens TE, Biederman J, Faraone SV, Martelon M, Westerberg D, Spencer TJ. Presenting ADHD symptoms, subtypes, and comorbid disorders in clinically referred adults with ADHD. *J Clin Psychiatry*. 2009;70(11):1557-1562.
  14. Ross RG. Psychotic and manic-like symptoms during stimulant treatment of attention deficit hyperactivity disorder. *Am J Psychiatry*. 2006;163(7):1149-1152.
  15. Akiyama K, Saito A, Shimoda K. Chronic methamphetamine psychosis after long-term abstinence in Japanese incarcerated patients. *Am J Addict*. 2011;20(3):240-249.
  16. Abali O, Mukaddes NM. Methylphenidate induced hallucinations: Case report. *Klinik Psikofarmakoloji Bulteni- Bulletin of Clinical Psychopharmacology*. 2007; 17: 195-197.