## Case report / Olgu sunumu

# 3240 mg long acting methylphenidate intake for suicide attempt

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#### ABSTRACT

Pharmacotherapy is frequently used to treat symptoms of attention-deficit/hyperactivity disorder (ADHD), the most common neurobehavioral disorder of childhood. There are a few reported cases of overdose for suicide attempts or abuse with methylphenidate in current literature. Majority of these cases fully recovered after supportive therapy. We present a patient who ingested 3240 mg long acting methylphenidate for suicide attempt. He experienced increase in heart beat rate and blood pressure but he did not have additional symptoms. Although no serious neurological or cardiovascular event happened in this case, the supervised stimulant use is needed in child and adolescent population. Further studies are needed to evaluate the effect of methylphenidate overdose. (Anatolian Journal of Psychiatry 2014; 15(Suppl.1):S1-S3)

Key words: methylphenidate, suicide, adverse effects

## 3240 mg uzun etkili metilfenidat alımı ile intihar girişimi

#### ÖZET

Çocukluk çağında en sık görülen nörodavranışsal bozukluk olan Dikkat Eksikliği Hiperaktivite Bozukluğunda (DEHB), belirtilerin tedavisinde sıklıkla farmakoterapi kullanılmaktadır. Şimdiye kadarki literatüre bakıldığında yüksek doz metilfenidatla kötüye kullanım veya intihar girişimi çok az sayıda bildirilmiştir. Bu olguların çok büyük bir kısmı da destekleyici tedavi sonrası tamamen iyileşmiştir. Biz bu yazıda 60 adet 54 mg.lık tablet (toplam 3240 mg) uzun etkili metilfenidatla alarak intihar girişiminde bulunan olguyu sunuyoruz. Olguda kalp atım hızında ve kan basıncı dışında herhangi bir ek belirti saptanamamıştır. Her ne kadar bu olguda ciddi nörolojik veya kardiyovasküler olay gelişmemişse de, çocuk ve ergenlerde stimulanlar kontrollü olarak kullanılmalıdır. Ayrıca metilfenidat aşırı dozu için daha fazla çalışma gerekmektedir. **(Anadolu Psikiyatri Derg 2014; 15(Ek sayı.1):S1-S3)** 

Anahtar sözcükler: Metilfenidat, intihar girişimi, ters etkiler

#### INTRODUCTION

Attention deficit and hyperactivity disorder (ADHD) is the most common disruptive disorder among children and adolescents. Stimulants are widely used drugs for the treatment of ADHD. Methylphenidate, affects various neurotransmitters like serotonin, noradrenaline and dopamine and it is the most studied drug for ADHD treatment. Methylphenidate, the most studied drug for ADHD, effects various neurotransmitters like serotonin, noradrenaline and dopamine.<sup>1</sup> There are two forms of methylphenidate used in Turkey; one is short acting

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form Ritalin®, and long acting form Concerta®. The acting time of Concerta is estimated around 12 hours in laboratory studies.<sup>2</sup>

Methylphenidate often cause increase in heart beat rate and blood pressure that are mostly related with the direct adrenergic agonist effects of methylphenidate. Methylphenidate and other stimulants have negative effects on cardiovascular system even sudden deaths associated with the use of methylphenidate was reported in literature, but pathophysiologic pathway has not been understood yet.<sup>3</sup> Until now there are a few reported cases of overdose for suicide attempts or abuse with methylphenidate.<sup>2,4,5</sup> Majority of these cases fully recovered after supportive therapy. We present a patient who experienced increase in heart beat rate and blood pressure after ingestion of 3240 mg long acting methylphenidate for suicide attempt.

### CASE

Our case was a 14 year old boy. He was diagnosed as ADHD and administered methylphenidate in a university hospital at the age of 11. Methylphenidate was effective for ADHD symptom control but he did not attend his follow up visits last six months. Three months ago he discontinued his medication and symptoms restarted. He had multiple substance abuse disorder but not used any drug in the last two weeks. Until suicide attempt there were no symptoms of tics, obsessive, or compulsive behavior. He did not have elevated or depressive mood and he did not mentioned delusions or hallucinations. In August, he decided suicide impulsively after an argument with his girlfriend by the ingestion of 60 tablets of Concerta 54 mg. Approximately two hours after ingestion he felt palpitation and he told this situation to his aunt's son. He was immediately brought to emergency unit of Bakırköy Sadi Konuk Public Hospital. In his initial evaluation he was conscious and cooperative. His Glasgow Coma Scale score was 15. His blood pressure was 147/71 mmHg, pulse rate was 124 beats /min, respiration rate 20 breaths/min and oxygen saturation of 97 SpO<sub>2</sub>. Sinus tachycardia was detected in his electrocardiogram (ECG). On ECG QRS duration, corrected QT duration, the amplitude of Rwave in aVR and PR interval was found to be normal. Initial laboratory results including full blood count, electrolytes, prothrombin time (PT), partial thromboplastin time (PTT), and liver function tests were also normal.

the emergency room.

He was observed for 8 hours at the emergency unit. His last blood pressure was 139/75 mmHg, pulse rate was 115 beats/min and oxygen saturation was 99 SpO<sub>2</sub>. Then he was discharged from hospital without any symptoms. His family was instructed for careful supervision of cardiologic symptoms in 24 hours of ingestion. No medication allowed for two days. During discharge he was referred to child and adolescent psychiatry outpatient clinic of Bakirkoy Mental Health Hospital for follow up visits.

### DISCUSSION

Several trials that assessed the safety and effectiveness of stimulants proved that with usual dosages stimulants including methylphenidate are safe and effective in patients with ADHD.<sup>1</sup> However; cardiovascular safety data on stimulants from pharmacoepidemiologic studies are limited and inconsistent. Methylphenidate and other stimulants may have negative effects on cardiovascular system.<sup>3</sup> Placebo-controlled studies in children and adults indicate stimulants elevate systolic blood pressure levels by approximately 2-5 mm Hg and diastolic blood pressure by 1-3 mm Hg, and also lead to increase in heart rate. Recently Westover et. al. systematically reviewed the association of stimulant use and adverse cardiovascular event. They reported that six out of seven studies in children and adolescents did not show an increased risk of adverse cardiac events.<sup>3</sup> Likewise, Olfson et al. found no severe cardiovascular events in a cohort study.

The overdose of methylphenidate can be seen only in emergency clinics due to suicide or abuse. Therefore to date there are only a few cases of overdose with short acting methylphenidate and there is only one case with long acting methylphenidate in literature. Methylphenidate overdose leads to a wide range of clinical manifestations, related with primarily neurologic and cardiovascular system. These effects include irritability, agitation, euphoria, dizziness, restlessness, hallucinations, delusions, psychosis, tremors, tachycardia, hypertension, atrial and ventricular tachydysrhythmias, and chest pain. Hyperthermia, seizures and coma occur in severe intoxications. In this case, approximately 3.2 grams methylphenidate ingestion was much higher than other reported cases.<sup>5</sup>

Fifty grams of active charcoal administered in Anatolian Journal of Psychiatry 2014; 15(Suppl.1):S1-S3

White and Yadao described 251 patients

younger than 19 with exposures to immediaterelease methylphenidate to a regional poison center over a 2-year period. Of them only 29 percent of the children developed symptoms. Since overdose mostly reported in children 6 to 11 years old, medication error was thought in this age group.' In literature the majority of overdoses with methylphenidate was asymptomatic, and was treated at home in these age groups. However, overdoses in adolescents were occurred with drug abuse or suicide attempt and mostly symptomatic.8 Similar to their findings, our patient was an adolescent and he ingested the Concerta with the intent of suicide. Although he ingested huge amounts of methylphenidate, his general condition and findings were good. Only sinus tachycardia, and increase in blood pressure was detected in emergency unit.

Although there is no evidence of methylphenidate abuse in the present case, methylphenidate abuse is another side of the stimulants. Methylphenidate abuse is low but it is concerned about its potential abuse risk especially in United States. Patients with ADHD are also at risk to misuse their prescribed methylphenidate medication. Oral and nasal abuse of methylphenidate is most common and is in general associated with minor or moderate sympathomimetic toxicity.<sup>8</sup> In contrast, severe toxicity and deaths has been reported for both intravenous and intra-arterial administration of crushed methylphenidate tablets.<sup>9,10</sup> However, we could not find any death case in literature due to unintentional or suicidal ingestion of methyphenidate. An analysis of the American Association of Poison Control Center's Toxic Exposure Surveillance System (TESS) database for deaths from ingestion methyphenidate from 2000 to 2006 found two deaths due to abuse of methyphenidate.<sup>5</sup>

Methylphenidate is also misused in combination with other drugs. For the methyphenidate overdose intoxication with drugs such as cocaine, amphetamines, phencyclidine, mescaline, lysergic acid diethylamide, psilocybin, pseudoephedrine, ephedrine, phenylpropanolamine, caffeine, and anticholinergics should be investigated. To preclude gastrointestinal absorption with activated charcoal by the oral route recommended. For the neurologic symptoms benzodiazepines, phenobarbitals, haloperidol or droperidol can be given. If blood pressure is seriously high, an  $\alpha$ -adrenergic antagonists, vasodilators, or calcium channel blockers can be applied.<sup>8</sup>

The use of stimulants labeled for treatment of ADHD increased rapidly in children during the period 2001 to 2010. Unintentional or intentionnal poisoning may increase due to this increased prescription. Although no serious neurological or cardiovascular event happened in this case, a supervised stimulant use is needed in child and adolescent population.

Further studies are needed to evaluate the effect of overdose.

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