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A case with theophylline intoxication

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Summary

Theophylline is an agent used in the treatment of obstructive airway diseases. It has a risk of intoxication with serum concentrations higher than 15 µg/mL. A seven-year-old female patient presented with complaints of vomiting and headache. She had tachycardia and other physical examination findings were found to be normal. We were informed that she ingested 10 tablets named Bronkolin® each containing 300 mg theophylline. Her serum theophylline levels were found to be >40 µg/ml (normal range: 10-20 µg/ml). She was monitorized and received charcoal, potassium supplementation and intravenous fluid. Her serum theophylline declined to 3.1 µg/ml and she was discharged. With this case presentation we wanted to emphasize that the possibility of drug intoxication should be considered in presence of hyperglycemia, hypopotassemia and tachycardia with accompanying symptoms including acute and unexplained vomiting and headache. (*Turk Arch Ped* 2013; 48: 55-56)

Key words: Hyperglycemia, intoxication, theophylline, vomiting

Introduction

Theophylline is a drug used in treatment of obstructive airway diseases (1) Theophylline which is a derivative of methylxantine prevents intracellular destruction of aminomonophosphate by inhibiting phosphodiesterase enzyme (1,2). Although the therapeutic level has been reported to be 10-20 µg/mL in some resources, there is a risk of intoxication when the blood level of theophylline is above 15 µg/mL (3). Therefore, when steady state is reached, the therapeutic level which is accepted to be safer and more efficient is 5-15 µg/mL (4). When the blood level increases above 20 µg/mL due to theophylline intoxication, abdominal pain, nausea and vomiting are observed, while tachycardia, arrhythmia and stroke may be observed above 30 µg/mL (5). In addition, metabolic disorders including hyperglycemia, hypokalemia, acid-base balance disorder and leukocytosis may be noted (6). In this article, a female patient who was diagnosed as theophylline intoxication was presented to emphasize the importance of the subject.

Case

A 7-year-old female patient presented with complaints including severe vomiting and headache. Her general status was

well, her consciousness was open and she appeared weak. Tachycardia was found on cardiovascular examination and other system examinations were found to be normal. Abnormal laboratory findings were as follows: glucose 146 mg/dL, potassium 2.9 mEq/L, white blood cells 25 720/mm³. Complete urinalysis and blood gases were found to be normal. On electrocardiogram, sinus tachycardia was found. Computerized tomography was found to be normal. Drug intoxication was considered because of hyperglycemia, hypokalemia and recurrent vomiting episodes and it was learned that the patient ingested 10 tablets of Bronkolin® 300 mg which contains theophylline approximately 6 hours before. The blood level of theophylline was found to be 58.2 µg/mL (N: 10–20 µg/mL). The patient was monitorized and active charcoal, potassium and fluid treatment was administered. In the follow-up the vital signs were balanced, she had no complaint and the follow-up blood theophylline level was found to be 3.1 µg/mL. The patient was discharged to come back for follow-up visits.

Discussion

Theophylline intoxication can occur in three forms; acute, subacute and chronic (7). Negative effects especially on the cardiovascular system, nervous system, gastrointestinal system

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and metabolic system are observed (8). In acute theophylline intoxication, vomiting, tachycardia and agitation are observed classically. In addition, increase in serum glucose, calcium, creatinine kinase, myoglobin and the number of leukocytes and decrease in magnesium, potassium and phosphorus level, hypotension, arhythmias, headache, shivering, nervousness, convulsion, respiratory alkalosis or metabolic acidosis may be observed (6,9). Our patient who presented with complaints including vomiting and headache had hyperglycemia, hypopotassemia, leukocytosis and tachycardia.

The diagnosis of theophylline intoxication is made by measurement of blood theophylline level. Although the therapeutic level is reported to be 10-20 µg/mL in some resources, there is a risk of intoxication when the theophylline blood level is above 15 µg/mL (3). In our patient, the theophylline level was 3.5 fold higher than normal.

Administration of oral active charcoal is a good option in treatment of theophylline intoxication (10). We administered four doses of active charcoal to our patient.

Theophylline intoxication is usually observed as chronic intoxication in patients who use the drug regularly and acute intoxication is encountered rarely. Therefore, a careful history and interrogation if there is an individual who uses this drug in the family are life saving considering the significance of diagnosis and starting treatment.

In presence of hyperglycemia, hypopotassemia and tachycardia together with findings including acute and

unexplained vomiting and headache, it should be kept in mind that an underlying drug intoxication may be present.

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