Lamotrigine Overdose with Urine Toxicology Positive for Phencyclidine: A Case Report of Possible Cross-Reactivity

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BACKGROUND

False-positives can occur when a medication has a cross-reactivity with the immunoassay, often due to similarity in structure of the parent medication or one of its metabolites to the tested drug. The occurrence of false-positives is mostly affected by the type of immunoassay used and the particular agent being tested. We present a case of a 13 year old female who was status post overdose with lamotrigine with positive urine toxicology with PCP (Phencyclidine.)

REVIEW OF LITERATURE

Urine, blood, hair, saliva, sweat, and nails are some biological specimens used to perform laboratory drug testing, and they provide different levels of specificity, sensitivity, and accuracy. Urine is most often preferred because of ease of collection. Concentrations of drugs and metabolites also tend to be high in the urine, allowing longer detection times than concentrations in the serum allow.

Two types of urine drug screens are typically used, immunoassay and gas chromatography-mass spectrometry (GC-MS). Immunoassays, which use antibodies to detect the presence of specific drugs or metabolites, are the most common method for the initial screening process. Advantages of immunoassays include large-scale screening through automation and rapid detection.

The main disadvantage of immunoassays is obtaining false-positive results when detection of a drug in the same class requires a second test for confirmation. Gas chromatography-mass spectrometry is considered the standard for confirmatory testing. The method is able to detect small quantities of a substance and confirm the presence of a specific drug (eg, morphine in an opiate screen). It is the most accurate, sensitive, and reliable method of testing; however, the test is time-consuming, requires a high level of expertise to perform, and is costly. For these reasons, GC-MS is usually performed only after a positive result is obtained from immunoassay.

CASE PRESENTATION

Ms. A is a 13 year old female, with significant psychiatric history of Post-Traumatic Stress Disorder and Attention Deficit Hyperactivity Disorder. She denied any psychoactive substances of abuse including PCP. Her history was collaborated by her mother. History revealed that patient was found unresponsive in bed with a suicide note and bottles at her bedside with 13 of 100mg pills of lamotrigine missing and 13 of 50mg pills sertraline. She was brought to pediatric emergency room by ambulance activated by her mother. On arrival to the hospital, the patient was not verbally responsive; she was responsive only to tactile stimuli. Her vital signs were within normal limits. Her urine toxicology was positive for PCP. Her Basic Metabolic Panel, Liver Function Test, and Complete Blood Count were within normal. She was stabilized after two days and was transferred to child and adolescent psychiatry unit for continued treatment. She was treated with Zoloft 100mg daily, Seroquel 150mg daily, and Valproic Acid of 750mg po total daily dose (blood level 68.1 µg/mL) with good effects on her impulse control and mood lability.

Agents Causing Potential False-Positive Results in Urine Drug Screening

Medication	PCP	Opioids	Methadone	THC	Barbiturates
Lamotrigine	X				
Tramadol	X				
Ibuprofen	X			X	X
Venlafaxine	X				
Dextromethorphan	X	X			
Diphenhydramine	X		X		
Doxylamine	X	X	X		

DISCUSSION

The literature describes that lamotrigine can cause false positive urine toxicology for PCP. In Our case report, our patient denied any history of substance abuse and it was known that she overdosed on lamotrigine. Although a repeat urine toxicology was not done because of patient refusal to cooperate at that time, the suspicion that the positive urine toxicology for PCP was most likely from medication cross reactivity in a patient who has no clinical history of PCP use.

BIBLIOGRAPHY

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LIMITATIONS

1. Failure to repeat urine toxicology screen to see if patient remained positive for PCP a day or two later
2. A Lamotrigine level was not performed confirming patient's overdose in context of patient's refusal to comply with further testing.