

Clinical Utility of High-Resolution Mass Spectrometry in a Pediatric Case of Altered Mental Status

Badea, A^{1,2}

- 1- Department of Pathology and Laboratory Medicine, Rhode Island Hospital, Providence, RI, USA
- 2- Department of Pathology and Laboratory Medicine, Warren Alpert Medical School of Brown University, Providence, RI, USA

Background:

A 16-year-old male with a medical history of anxiety, ADHD, and multiple prior episodes of altered mental status (AMS) with no resolved etiology presents to the emergency department (ED) with AMS. He received Narcan with no improvement. He was admitted to the neurology service and had an EEG that did not show epileptiform activity. Routine labs were unremarkable.

Extreme somnolence can be caused by an overdose or as a side effect of various medications: antihistamines, antiemetics, barbiturates, benzodiazepines and opioids to name a few. Adding to that sedatives like xylazine, a known contaminant of the illicit drug supply, along with non-toxic etiologies such as seizures and other neurological conditions, and the diagnosis of an AMS episode involving somnolence becomes a complex process.

Methods and Results:

A clinically validated comprehensive drug screen test using LC-QTOF-MS was performed. The urine specimen was centrifuged, diluted with solvent, and injected onto a SCIEX X500R platform. The untargeted data collection was performed using a positive-ion mode TOF-MS survey scan with IDA-triggered collection of high-resolution product ion spectra (20 dependent scans). The data was analyzed using an in-house validated library of 318 drugs and metabolites spanning multiple drug classes. The specimen was positive for amphetamine, trazodone, citalopram (prescribed), naloxone, lorazepam (administered), and clozapine, a second-generation antipsychotic, as an unexpected finding.

Conclusion:

The patient's presentation was consistent with previously reported clozapine toxicity symptoms. However, the clozapine toxidrome includes many symptoms that are not all present concomitantly in exposed individuals. AMS in the form of extreme sedation can be attributed to other toxic agents as well as neurologic etiologies. Immunoassay drug screens were positive for amphetamine, known prescribed medication. Clozapine was not on the home medications list. Upon further investigation, the parents realized they mixed up medications and had given the patient the doses intended for his brother, whose clozapine prescription had been discontinued months prior. Post correction, the patient's symptoms resolved permanently. Comprehensive drug testing by LC-QTOF-MS was the key to resolving this case. Had this test been employed in earlier episodes, rehospitalization of patient could have been prevented.

Key words: toxicology, poisoning, clozapine, LC-QTOF, HRMS