120. Intermittent haemodialysis in lamotrigine poisoning

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Background: Lamotrigine poisoning is usually benign causing only mild to moderate neurological or cardiovascular effects. However, there have been case reports of lamotrigine poisoning leading to seizures, sudden cardiovascular collapse and death. It has not been clear if haemodialysis can effectively remove lamotrigine. We provide pharmacokinetic data on a large lamotrigine overdose that was managed with intermittent haemodialysis.
Case details: A 23-year-old (90 kg) female presented to hospital 2 h post-ingestion of 17.8 g of lamotrigine and 9 g of quetiapine. On presentation GCS 12, heart rate 150bpm, blood pressure 136/90 mmHg. She was intubated 3.5 h post-ingestion and given 50g of activated charcoal. She received three further doses of activated charcoal over the next 12 h. Her initial electrocardiogram (ECG) showed a sinus tachycardia with a rate of 126bpm, QRS 96 ms, absolute QT 330ms with a prominent R wave of 5mm. Her lamotrigine concentration 3 h post-ingestion was 21.5 mg/L ($N = 3$–13mg/L). Her ECG subsequently developed a right bundle branch block pattern with progressive QRS widening (max 120ms) and ST depression in anterior leads with T wave inversion. She was commenced on continuous veno-venous heamodiafiltration therapy (CVVHDF) but the circuit clotted on three occasions. Eleven hours post-ingestion she still had ongoing ECG changes despite a bolus of 100 mmol of sodium bicarbonate. Hence, she was commenced on intermittent haemodialysis (IHD) 16 h post-ingestion (blood flow rate = 250mL/min, dialysate flow rate 500mL/min). During IHD multiple lamotrigine concentrations were collected. Using the A–V pair method, the mean extraction ratio of lamotrigine during IHD was 0.4 with a mean clearance of 78 mL/min. The half-life of lamotrigine was significantly shorter during IHD, 4.1 h versus 30.4 h post-IHD. She was extubated 42 h post-ingestion and made a full recovery. On extubation she acknowledged taking only 9 g of lamotrigine.
Case discussion: How to best predict which patients with lamotrigine overdose will deteriorate is unknown. There also not appear to be a dose related effect with case reports of deterioration at variable doses. In this case, ECG changes suggestive of sodium channel blockade were used to trigger the need for haemodialysis. This patient did not develop severe toxicity and it is difficult to determine if IHD altered her clinical course. However, this case provides very useful information regarding how dialyzable lamotrigine is in an acute overdose. The extraction ratio, clearance, and half-life of lamotrigine, while the patient was receiving IHD were calculated, which has not been previously reported. The calculated clearance using the A–V pair method was 78 mL/min and mean extraction ratio 0.4. In this patient the half-life was substantially reduced to 4.1h during IHD compared with 30.4h post-IHD.
Conclusions: This case demonstrates that intermittent haemodialysis is very effective in removing lamotrigine in acute overdose. IHD resulted in a significantly shorter half-life and should be considered as a treatment option for large lamotrigine poisoning.

KEYWORDS Lamotrigine; intermittent hemodialysis; poisoning

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121. Comparing intentional exposure rates between stimulants in the RADARS® system poison center data

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Background: Stimulant prescriptions have continued to increase over the past two decades. An increase in prescriptions dispensed also brings concerns about non-medical use of stimulants according to the National Institutes of Health. Stimulants have the ability to treat a variety of symptoms, including Attention Deficit Hyperactivity Disorder, narcolepsy, and obesity; however, they also have an appeal for abuse and misuse. This study was interested in how the prescriptions dispensed have changed over time and in the changes in intentional exposure calls rates.
Methods: Data from the Researched Abuse, Diversion, and Addiction-Related Surveillance (RADARS®) System Poison Center Program collected from July 2010 through December 2016 as well as estimated prescriptions dispensed data from QuintilesIMS™ were analyzed. QuintilesIMS™ Government Solutions, Inc., a subsidiary of QuintilesIMS™ Health Inc. Intentional exposure calls (suspected suicide, abuse, misuse, and intentional unknown) involving amfetamines and methylphenidate were examined. Analysis was restricted to individuals 6 years of age and older. A generalized estimating equation Poisson regression was used to model the prescriptions dispensed rates as a function of drug group, time, and a drug group by time interaction. The individual poison centers were treated as subjects for the repeated measures as intentional exposure counts are likely correlated within centers over time.
Results: Intentional exposure calls for amfetamines and methylphenidate changed by +37% and +8%, respectively. The number of prescriptions dispensed in the same time period for amfetamines and methylphenidate changed by +80% and +28%, respectively. When accounting for the number of prescriptions dispensed, the rate of intentional abuse exposures to amfetamines and methylphenidate both decreased over time, with amfetamine exposures starting at a significantly higher rate in 2010Q3 ($p < .001$) yet decreasing at a significantly faster rate ($p = .023$) than methylphenidate exposures. However, exposure rates for both amfetamines and methylphenidate are significantly decreasing over time ($p < .001$ and $p = .009$).
Conclusions: While amfetamine calls have increased by 37%, methylphenidate calls have remained fairly constant since July 2010. When adjusting for the number of prescriptions dispensed, the intentional exposure call rate is decreasing for both drugs, with exposure calls for amfetamines decreasing at a faster rate than methylphenidate. Doctors should keep patients informed about the risk factors associated with stimulants along with medication adherence when prescribing these products.

KEYWORDS Stimulants; exposures; domestic poison centers

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