[ID-P#057] Phenobarbital overdose in a pediatric covid patient with Classic Maple Syrup Urine Disease in crisis: A Case Report

Maria Theresa Kristina M Ludovice and Joannakhris L. Biag
National Poison Management and Control Center University of the Philippines-Philippine General Hospital

Introduction: Seizure disorder in Classic Maple Syrup Urine Disease (MSUD) is commonly treated with anticonvulsants. Here, we present a case of a Phenobarbital overdose in a child diagnosed with MSUD.

Case Report Summary: A 10 year-old male with classic MSUD, intellectual disability and seizure disorder was brought to a primary hospital due to drowsiness. On history, patient's mother reported that he was apparently well until he was noted with ataxic gait and drowsiness hence suspected he may have ingested phenobarbital tablets upon noting missing tablets. Due to decrease sensorium, he was intubated, stabilized and transferred to a tertiary hospital. Multiple-dose activated charcoal (MDAC) and sodium bicarbonate ($NaHCO_3$) were initiated. Work up revealed elevated Phenobarbital assay (172.2umol/L) and leucine (1858.01 umol/L), COVID RAT positive, severe uncompensated metabolic acidosis, low potassium and magnesium levels, leukocytosis with neutrophilic predominance, slightly elevated liver enzymes, inflammatory markers and positive urine ketones. Antiepileptic medication was on hold, correction of electrolyte imbalance, antiviral therapy, and MSUD diet with valine and isoleucine was started. Episodes of desaturation, tachypnea and decreased breath sounds on the right lung field noted hence repeat CXR revealed pneumothorax and CTT, right was performed with improvement. Patient's consciousness improved on 2nd hospital day, however, there was seizure hence antiepileptics resumed, MDAC and $NaHCO_3$ was discontinued. Leucine and phenobarbital level has decreasing trends. Patient clinically improved, extubated and discharged on 12th hospital day.

Discussion: There are scarce reports about poisoning in patients with rare metabolic disorder. Although the clinical features of Phenobarbital toxicity are almost similar to MSUD, it is probable that the medication overdose may have triggered MSUD crisis. Phenobarbital showed a net influence on the transport of neutral amino acids which are precursors of monoamine neurotransmitters, increasing their uptake. In an in vitro study, it was found out that valine and leucine uptake in the mouse brain was stimulated by Phenobarbital hence a greater concentration of the barbiturates inhibits the transport of this amino acid, increasing its accumulation.