Death and Brain Injury From an Apparent Intentional Methomyl Poisoning

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AIMS: Pesticide poisoning is a common cause of morbidity and mortality worldwide but is rarely encountered in the death investigation toxicology laboratory in the United States. Methomyl (Acinate, Agrinate, DuPont 1179, NuBait,) is a highly toxic, class 1 carbamate insecticide which has been in use with restrictions since 1970. Like all carbamates, methomyl inhibits cholinesterase activity and results in symptoms of diarrhea, nausea and vomiting, abdominal pain, excessive sweating and salivation, blurred vision, difficulty breathing, headache and muscular fasciculation, leading to respiratory arrest and death. We present here a case of an apparent double methomyl poisoning resulting in one fatality, and one non-fatal case of anoxic brain injury.

CASE HISTORY: A male subject and his female companion were drinking together when he suddenly vomited, collapsed, and subsequently died. His companion developed blindness and confusion and was discovered approximately 22 hours later in her apartment. She was seemingly unaware that the male victim was deceased on the floor in front of her couch. Autopsy results in the male victim indicated early decomposition and mild to moderate coronary artery disease, but no obvious anatomic cause of death. The female victim was diagnosed with stroke as a result of oxygen deprivation. Investigators initially suspected methanol or ethylene glycol poisoning based upon the female victim's symptoms.

METHODS: Blood from both victims was analyzed for volatiles by headspace gas chromatography and headspace GC-MS. Drug screening was performed for cocaine, opiates, methadone, benzodiazepines, PCP, amphetamines, barbiturates, tricyclic antidepressants, cannabinoids and propoxyphene by EMIT, and for basic and acid-neutral drugs by GC-MS. No drugs other than caffeine were detected in either victim. There was a small amount of ethanol (0.02 gm/100 mL) in the male victim’s blood. A sample of gastric contents from the decedent was extracted which indicated the presence of methomyl in the basic fraction. It has a molecular weight of 105 amu, and the molecular ion is the most abundant ion, with two major fragments of 88 m/z and 58 m/z. There was no indication of methomyl in either of the victims’ blood or in a swab of the decedent’s vomitus. Analysis of other evidence from the scene confirmed the presence of methomyl in two drinking glasses, and in the liquid from the Jaegermeister bottle.

RESULTS AND CONCLUSIONS: Methomyl detection is challenging as it is unstable at standard GC injection port temperatures. In this case, we were able to detect it only due to the high concentrations in the drinks and the gastric content of the decedent. In this case the gastric contents were the only biological sample which tested positive for methomyl, highlighting the benefit of comprehensive postmortem sampling.

Keywords: Methomyl, Poisoning, Pesticide