NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

March 22, 2022

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. ACCIDENT: DCA22FM008; Amelia, LA

Date: December 23, 2021
Injuries: None

B. GROUP IDENTIFICATION

No group was formed for the medical evaluation in this accident.

C. DETAILS OF INVESTIGATION

1. Purpose

   This investigation was performed to evaluate the mate for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

2. Methods

   The last merchant mariner's medical exam, toxicology findings, and the investigator's preliminary report were reviewed. Relevant regulation and medical literature were reviewed as appropriate.

   Merchant Mariner Medical Exam

   According to the 35 year old male mate's most recent merchant mariner medical exam, dated 9/28/2020, the mate had no medical conditions and reported no use of medications to the physician.

   Toxicology

   Toxicology tests performed in accordance with US Coast Guard (USCG) requirements by Abbott on the mate's urine collected at 16:35 on the day

of the accident were negative for all tested-for substances.[1] (According to evidence from the vessel tracking service, the allision with the bridge was thought to have occurred at 0326 that morning.)

At the request of the USCG investigators, the mate underwent further toxicology testing using a hair sample. Performed by the United States Drug Testing Laboratory on hair obtained on 2/1/2022, this testing found the mate positive for methamphetamine and its metabolite amphetamine, buprenorphine and its metabolite norbuprenorphine, and fentanyl.

Substance Descriptions

Methamphetamine is a Schedule II controlled substance and is available in low doses by prescription to treat ADHD, ADD, obesity, and narcolepsy.[2] Recreational users seeking the intense euphoria produced by higher levels typically snort, smoke, or inject the drug.

Meth levels reach peak blood concentration differently depending on mode of administration. Peak blood methamphetamine concentrations occur shortly after injection, a few minutes after smoking, and around 3 hours after oral dosing. Peak plasma amphetamine concentrations occur around 10 hours after methamphetamine use. The half-life of meth is about 10 and 12 hours and the half-life of amphetamine is between about 8 and 14 hours.[3]

Symptoms of recreational methamphetamine use follow a typical pattern. In the early phase users experience euphoria, excitation, exhilaration, rapid flight of ideas, increased libido, rapid speech, motor restlessness, hallucinations, delusions, psychosis, insomnia, reduced fatigue or drowsiness, increased alertness, a heightened sense of well-being, stereotypes behavior, feelings of increased physical strength, and poor impulse control. In addition, the heart rate, blood pressure, and respiratory rate increase and they may have palpitations, dry mouth, abdominal cramps, twitching, dilated pupils, faster reaction times, and increased

[1] By regulation, post accident urine drug testing is limited to identifying urinary metabolites of amphetamine, methamphetamine, cocaine, codeine, morphine, heroin, phencyclidine (PCP), methylenedioxymethamphetamine (MDMA), methylenedioxyamphetamine (MDA), methylenedioxyethylamphetamine (MDEA), tetrahydrocannabinol (THC), oxycodone, oxymorphone, hydrocodone, and hydromorphone.

[2] Controlled substances are those that have been identified by the Drug Enforcement Administration as having the potential for abuse and dependence. Substances are placed in their respective schedules (I-V) based on whether they have a currently accepted medical use in treatment in the United States, their relative abuse potential, and likelihood of causing dependence when abused. Schedule I substances are not legally available because of limited medical use and high risk of abuse and dependence; Schedule II substances have a high potential for abuse which may lead to severe psychological or physical dependence. As the number of the Schedule goes up, the abuse and dependence potential goes down.

[3] National Highway Traffic Safety Administration. Drugs and Human Performance Fact Sheets. Methamphetamine. https://www.nhtsa.gov/sites/nhtsa.gov/files/809725-drugshumanperformfs.pdf. Accessed 7/29/2021.

strength. As the initial effects wear off users commonly experience dysphoria, restlessness, agitation, and nervousness; they may experience paranoia, violence, aggression, a lack of coordination, delusions, psychosis, and drug craving. Blood levels cannot be used to distinguish among phases of methamphetamine use.[3]

Buprenorphine is a Schedule III controlled substance, an opioid agonist/antagonist indicated for the treatment of opioid addiction. Only certain specially trained individuals may prescribe this medication. Like other opioids, buprenorphine may be abused and may cause central nervous system and respiratory depression. It carries a warning that it "may impair the mental or physical abilities required for the performance of potentially dangerous tasks such as driving a car or operating machinery, especially during treatment induction and dose adjustment. Caution patients about driving or operating hazardous machinery until they are reasonably certain that buprenorphine therapy does not adversely affect his or her ability to engage in such activities."[4]

Fentanyl is a Schedule II controlled substance and is an opioid agonist. For medical indications, it is available by patch, rapidly dissolving pills, and intravenous administration. In recent years, it has also become a street drug but the effects are the same (in street use, doses tend to be higher and there are more contaminants). It carries many of the same risks and warnings described above.[5]

D. SUMMARY OF MEDICAL FINDINGS

The 35 year old male mate had reported no medical conditions and no use of medications during his most recent merchant mariner medical exam. Required USCG urine toxicology testing on the day of the allision was negative for any tested-for substances. Hair toxicology testing, performed about 5 weeks later, was positive for methamphetamine and its metabolite amphetamine, buprenorphine and its metabolite norbuprenorphine, and fentanyl.

[4] National Institutes of Health. US National Library of Medicine. DailyMed. Buprenorphine. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=1bf8b35a-b769-465c-a2f8-099868dfcd2f Accessed 3/22/2022.

[5] National Institutes of Health. US National Library of Medicine. DailyMed. Fentanyl. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=4c3a6171-19e4-40c2-83f3-fb54d4736e4b Accessed 3/22/2022.