



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

May 26, 2022

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. CRASH: CEN22LA001; Warrensburg, MO

Date: October 3, 2021

Injuries: 2 fatal

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 pilots for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

2. Methods

The FAA medical case review, autopsy reports, toxicology findings, and the investigator's preliminary report were reviewed. Relevant regulation and medical literature were reviewed as appropriate.

Front Seat Uncertificated Pilot

FAA Medical Case Review

According to the FAA medical case review, the 61 year old male uncertificated pilot, seated in the front seat, had never had any registration with the FAA. As a result, the FAA has no medical information regarding him.

Autopsy

According to the autopsy report issued by the Jackson County Medical Examiner, the cause of death was multiple blunt force trauma, and the manner of death was accident. No significant natural disease was

identified. Acute methamphetamine intoxication was identified as an additional pathologic diagnosis.

Toxicology

Toxicology tests performed by AXIS Forensic Toxicology at the request of the medical examiner identified ethanol at 0.028 gm/dl, as well as methamphetamine at 3,249 ng/ml, and its metabolite, amphetamine at 272 ng/ml in cavity blood.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified ethanol at 0.025 gm/dl in cavity and 0.016 mg/hg in liver tissue but none in muscle tissue.¹ In addition, methamphetamine was identified in cavity blood at 2,533 ng/ml and in liver tissue at 8,219 ng/gm; its primary active metabolite, amphetamine, was identified in cavity blood at 191 ng/ml and in liver tissue at 738 ng/gm.

Substance Descriptions

Ethanol is primarily a social drug with a powerful central nervous system depressant effect. After ingestion, ethanol is quickly distributed throughout the body's tissues and fluids fairly uniformly. The distribution pattern parallels the water content and blood supply of each organ. Ethanol may also be produced in body fluids and tissues after death by microbial activity.²

Methamphetamine is a Schedule II controlled substance and is available in low doses by prescription to treat ADHD, ADD, obesity, and narcolepsy. Levels above 200 ng/ml indicate mis-use. Users seeking the intense euphoria produced by higher levels typically snort, smoke, or inject the drug and may reach levels above 2000 ng/ml.³

Symptoms of methamphetamine mis-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, heart rate, blood pressure, and respiratory rate increase and users may have palpitations, dry mouth, abdominal cramps, twitching, dilated pupils, faster reaction times, and increased strength. As the initial effects wear off users commonly experience dysphoria, restlessness, agitation, and

¹ References of mg/hg for solid tissues are directed related to gm/dl in liquids regarding ethanol levels.

² Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60> Accessed 03/02/2022.

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 5/24/2022.

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

Rear Seat Certificated Pilot

FAA Medical Case Review

According to the FAA medical case review, the 65 year old male certificated pilot, seated in the rear seat, was last medically certified in 2001. At that time, he had reported 150 hours of flight time and had not reported any chronic medical conditions or any use of medications to the FAA.

Autopsy

According to the autopsy report issued by the Jackson County Medical Examiner, the cause of death was multiple blunt force trauma and the manner of death was accident. The heart showed left ventricular hypertrophy and the kidneys showed evidence of nephrosclerosis, both usually a consequence of high blood pressure.

Toxicology

Toxicology tests performed by AXIS Forensic Toxicology at the request of the medical examiner identified oxycodone at 132 ng/ml in subclavian blood.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified oxycodone at 222 ng/ml in cavity blood, at 492 ng/ml in gastric fluid, and at 100 ng/gm in liver tissue as well as the presence of its metabolite, oxymorphone, in gastric fluid but not in cavity blood or liver tissue. In addition, hydroxychloroquine, carvedilol, and losartan were identified in cavity blood, gastric fluid, and liver. Finally, acetaminophen (also known as Tylenol) was found in liver and muscle tissues, and terbinafine (an antifungal medication) was identified in cavity blood, gastric fluid, and liver tissue. The last two are not generally considered impairing.

Substance Descriptions

Oxycodone and acetaminophen are commonly marketed in combination, often with the name Percocet, as a Schedule II opioid analgesic. It is a potent central nervous system depressant and carries warnings about misuse and abuse, respiratory depression, and that the use "may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery)," among other

effects.⁴ Blood levels thought to have effects are between 5 and 1,000 ng/ml.⁵

Hydroxychloroquine is a prescription medication used to prevent malaria and in the treatment of rheumatoid arthritis and lupus erythematosus (both autoimmune diseases). It carries a number of warnings including regarding risks of acute cardiac, psychiatric, and neurologic side effects as well as hypoglycemia.⁶

Carvedilol and losartan are prescription blood pressure medications and are not generally considered impairing.^{7,8}

D. SUMMARY OF MEDICAL FINDINGS

Front Seat Uncertificated Pilot

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⁴ National Institutes of Health. US National Library of Medicine. DailyMed. Oxycodone and Acetaminophen. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=94b95304-8d3b-496a-8d2c-22ae89688427> Accessed 5/24/2022.

⁵ M. Schulz, A. Schmoldt, H. Andresen-Streichert, S. Iwersen-Bergmann. Revisited: Therapeutic and toxic blood concentrations of more than 1,100 drugs and other xenobiotics. *Critical Care* 2020.6;24(1):195.

⁶ National Institutes of Health. US National Library of Medicine. DailyMed. Hydroxychloroquine. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=84b00366-96ef-41e1-bac6-5d24acdb9e1d> Accessed 5/24/2022.

⁷ National Institutes of Health. US National Library of Medicine. DailyMed. Carvedilol. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=63065e30-4a50-42b0-9622-a393923c1e98> Accessed 5/24/2022.

⁸ National Institutes of Health. US National Library of Medicine. DailyMed. Losartan. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=e0b74a86-3d36-1af0-e538-41b45b8d2cc3> Accessed 5/24/2022.

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