



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

July 20, 2022

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. CRASH: ERA22FA095; Jacksonville, FL

Date and time: December 26, 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 pilot for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

2. Methods

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

FAA Medical Case Review

According to the FAA medical case review, the 56 year old male pilot had reported 442 hours of flight experience as of his last aviation medical examination dated 6/15/2021. At that time he was 70 inches tall and weighed 232 pounds. He had reported a history of gastroesophageal reflux disease and the use of omeprazole to treat it to the FAA. This is not considered to be an impairing medication. Not significant abnormalities were identified and he was issued a second class medical certificate limited by a requirement for corrective lenses.

Autopsy

According to the autopsy report issued by the Office of the Medical Examiner, Jacksonville, Florida, the cause of death was blunt impact trauma and the manner of death was accident. The examination was somewhat limited by the extent of blunt and thermal injury but no significant natural disease was noted.

Toxicology

Toxicology tests performed by NMS Labs at the request of the pathologist identified caffeine and amphetamine at 12 ng/ml in cavity blood.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified diphenhydramine at 21 ng/ml and amphetamine at 12 ng/ml in cavity blood and identified both in liver tissue.

Substance Descriptions

Caffeine is a mild stimulant commonly found in coffee, tea, and some sodas. It is not generally considered impairing.

Amphetamine is a prescription controlled drug used to treat narcolepsy, obesity, and attention deficit disorders. In medicinal settings, blood levels average less than 20 ng/ml. It may also be used to intentionally get high.¹

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the names Benadryl and Unisom. Compared to other antihistamines, diphenhydramine causes marked sedation; it is also classed as a central nervous system depressant and this is the rationale for its use as a sleep aid. Altered mood and impaired cognitive and psychomotor performance may also be observed. In fact, in a driving simulator study, a single dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100 gm/dl.² Levels thought to be associated with routine effects are between 25 and 112 ng/ml.³ However, diphenhydramine undergoes postmortem redistribution, which means after death it can move back into pooled blood from storage sites. For diphenhydramine, postmortem central blood levels may increase by about three times. How this may affect cavity blood is difficult to predict but low levels in cavity blood suggests that antemortem levels were also low.

¹ National Highway Traffic Safety Administration. Drugs and Human Performance Fact Sheets. Amphetamine. <https://www.nhtsa.gov/sites/nhtsa.gov/files/809725-drugshumanperformfs.pdf> Accessed 6/28/2022.

² Weiler JM, B.J., Woodworth GG, Grant AR, Layton TA, Brown TL, McKenzie DR, Baker TW, Watson GS., Effects of fexofenadine, diphenhydramine, and alcohol on driving performance. A randomized, placebo-controlled trial in the Iowa Driving Simulator. Ann Intern Med 2000. 132(5): 354-63.

³ Warren C. Rodrigues, Catherine Castro, Philip Catbagan, Christine Moore, Guohong Wang. Immunoassay Screening of Diphenhydramine (Benadryl®) in Urine and Blood Using a Newly Developed Assay. Journal of Analytical Toxicology, 2012.36 (2):123-129.

D. SUMMARY OF MEDICAL FINDINGS

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