

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN22FA406

MEDICAL

Specialist's Factual Report

May 1, 2023

A. ACCIDENT

Location: Cleveland, Tennessee
Date: 9/5/2022
Time: 17:11 Local
Airplane: Cessna 182P; N58807

B. MEDICAL SPECIALIST

Specialist Michelle Watters, MD, PhD, MPH
National Transportation Safety Board, RE-1
Washington, DC

C. DETAILS OF THE INVESTIGATION

Purpose

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

Methods

The Federal Aviation Administration (FAA) medical certification file, FAA medical case review, the pilot's autopsy report, and FAA Forensic Sciences Laboratory toxicology report¹ were reviewed. Other relevant medical and regulatory issues were reviewed.

D. FACTUAL INFORMATION–PILOT

1.0 FAA Medical Certification File and Medical Case Review

According to the FAA medical certification file and FAA medical case review, at the time of the accident, the 68-year-old male pilot held a third class FAA medical certificate with a continuation of special issuance for sleep apnea and glaucoma and with the limitation that he must wear lenses for distant and have glasses for near vision. His most recent FAA medical certification exam was on 5/3/21 and at that time he reported he had accrued 393 total flight hours. He was 71 inches tall and weighed 252 pounds. In addition to sleep apnea, he reported taking lisinopril and amlodipine to treat high blood pressure and cetirizine, olopatadine, fluticasone, and montelukast for hay fever. The pilot's FAA medical certification examinations dated back to 2004.

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1,000 substances including toxins, common prescription and over-the-counter medications, and illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

2.0 Autopsy

According to the autopsy report prepared for the Bradley County Medical Examiner, Cleveland, Tennessee, the pilot's final anatomic diagnoses were multiple blunt force injuries. The examination was limited by extensive trauma, evisceration, and fragmentation; the pilot's brain, heart, and lungs had blunt force injuries. The forensic pathologist did not comment on natural disease.

3.0 Toxicology

Toxicology testing performed for the medical examiner's office was negative for ethanol and tested-for drugs in the pilot's muscle tissue. Toxicology testing performed by the FAA Forensic Sciences Laboratory detected ethanol in the pilot's muscle tissue at 0.022 grams per hectogram (gm/hg).² The antihistamines diphenhydramine and cetirizine (10 nanograms per gram [ng/gm]) were detected in his muscle tissue. The muscle relaxant cyclobenzaprine and its metabolite norcyclobenzaprine were detected in his muscle tissue at 5 ng/gm and 20 ng/gm, respectively. No blood specimens were available for toxicology testing.

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. It acts as a central nervous system depressant; it impairs judgment, psychomotor functioning, and vigilance. Ethanol is water soluble, and after absorption it quickly and uniformly distributes throughout the body's tissues and fluids. The distribution pattern parallels water content and blood supply of the tissue. Ethanol can be produced after death by microbial activity, often in conjunction with other alcohols.³ Extensive trauma increases the spread of bacteria and raises the risk of ethanol production after death.⁴

Diphenhydramine is a sedating antihistamine (commonly marketed as Benadryl) and is available over the counter in many products used to treat colds, allergies, and insomnia. Diphenhydramine carries the warning that use of the medication may impair mental and physical ability to perform potentially hazardous tasks, including driving or operating heavy machinery. It has a half-life of 3 to 14 hours.⁵ *Cetirizine* is a second-generation antihistamine used to relieve hay fever and allergy symptoms. It is available over the counter, commonly marketed as Zyrtec. Although designed to be less sedating than the first generation antihistamines, cetirizine does have some sedating properties. The elimination half-life is between

² Grams per hectogram in tissue samples are directly comparable to grams per deciliter in liquid samples.

³ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Ethanol.
<http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60>

⁴ Kugelberg, FC and AW Jones. 2007. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Science International* 165(1):10-29.

⁵ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Diphenhydramine.
<https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50>.

6.5 and 10 hours.⁶ FAA provides guidance on wait times before flying after using these antihistamines.^{7,8}

Cyclobenzaprine is a prescription medication commonly marketed as Flexeril. It is indicated for relief of muscle spasm associated with acute, painful musculoskeletal conditions. *Norcyclobenzaprine* is the major metabolite of cyclobenzaprine. Cyclobenzaprine use may impair mental or physical ability for performing hazardous tasks. Its half-life averages around 18 hours.^{9,10}

E. SUMMARY OF MEDICAL FACTS

The 68-year-old male pilot held a third class FAA medical certificate with a continuation of special issuance for sleep apnea and glaucoma and with the limitation that he must wear lenses for distant and have glasses for near vision. At his most recent FAA medical certification exam on 5/3/21, in addition to sleep apnea, he reported taking lisinopril and amlodipine to treat high blood pressure and cetirizine, olopatadine, fluticasone, and montelukast for hay fever. According to the autopsy report, the pilot's final anatomic diagnoses were multiple blunt force injuries. No comments were provided on any natural disease; the brain, heart, and lungs were noted to have sustained blunt force injuries and the body was fragmented.

Toxicology testing detected ethanol in the pilot's muscle tissue at 0.022 grams per hectogram (gm/hg) in one sample but was not detected in another muscle tissue sample. Diphenhydramine, cetirizine, cyclobenzaprine, and norcyclobenzaprine were detected in the pilot's muscle tissue.

Submitted by:
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Medical Officer, RE-1

⁶ FAA. Updated 1/16/19. Forensic Toxicology Drug Information.

Cetirizine. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=131>

⁷ FAA. 11/13/19. What over-the-counter (OTC) medications can I take and still be safe to fly?
OK-20-0302

https://www.faa.gov/licenses_certificates/medical_certification/media/OTCMedicationsforPilots.pdf

⁸ FAA. Updated 10/26/22. [AllergyAntihistamineImmunotherapyMedication.pdf \(faa.gov\)](#)

⁹ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Cyclobenzaprine. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=133>

Norcyclobenzaprine. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=372>

¹⁰ National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). [DailyMed - CYCLOBENZAPRINE- cyclobenzaprine hydrochloride tablet, film coated \(nih.gov\)](#). Updated 12/30/19.