



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **June 7, 2022**

Michelle Watters, MD, PhD, MPH
Medical Officer

A. ACCIDENT: WPR19FA172 – Porter Ranch, California

Date/Time: June 15, 2019; 9:10 a.m. (PDT)
Aircraft: Nanchang CJ6, N269AG
Injuries: 1 Fatal
Flight Conducted under Part 91 personal flight.

B. GROUP IDENTIFICATION

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

C. DETAILS OF 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 case review and the pilot's autopsy and Forensic Sciences Laboratory toxicology¹ reports were reviewed. Other pertinent scientific and regulatory issues were reviewed.

FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 66-year-old male pilot held a second class medical certificate with the limitation that he must wear corrective lenses for near and distant vision. At the time of the most recent exam (8/13/18), the pilot was 73 inches tall and weighed 212 pounds. He reported having 12,500 total flight hours. He reported taking no medications and having hay fever. No significant medical concerns were identified.

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1300 substances including toxins, common prescription and over-the-counter medications as well as illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

Autopsy

According to the autopsy performed by the County of Los Angeles, Department of the Medical Examiner-Coroner, the cause of death in the pilot was blunt trauma and the manner of death was accident. The medical examiner reported that the pilot's heart was enlarged (500 grams) and the pilot had mild to moderate coronary artery and aortic atherosclerosis.

Toxicology

Toxicological testing performed by the FAA's Forensic Sciences Laboratory identified the sedating antihistamine diphenhydramine at 44 nanograms per milliliter (ng/mL) in the pilot's cavity blood and in his liver tissue. The sedative-hypnotic medication zolpidem was detected in his heart blood and liver tissue but not quantified. Tadalafil, an erectile dysfunction medication commonly marketed as Cialis, was detected in his muscle and liver tissue; this medication is generally considered non-impairing.² Toxicology testing performed by the medical examiner was negative for tested-for drugs in the pilot's heart blood.

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. The therapeutic range is 50 to 100 ng/mL, and it has a half-life of 3 to 14 hours.³ Diphenhydramine undergoes postmortem distribution and central levels may be two to three times higher than peripheral levels.⁴ FAA provides guidance on wait times before flying after using this medication; post-dose observation time is 60 hours and the medication is not for daily use.^{5,6}

Zolpidem is a sedative-hypnotic drug indicated for the short-term treatment of insomnia that is commonly marketed as Ambien. The therapeutic range is between 80 and 160 ng/mL and it has a half-life between 1 and 5 hours. Zolpidem is a central nervous system depressant and carries the warning that adverse reactions may include drowsiness, prolonged reaction time, dizziness, blurred/double vision, reduced alertness, and impaired driving the morning after therapy.^{7,8} FAA requires a minimum waiting time of 24 to 36 hours after the last dose of zolpidem before resuming pilot duties.⁹

² National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). Updated 11/24/21. [DailyMed - TADALAFIL tablet \(nih.gov\)](#)

³ Schulz, M, A Schmoldt, H Andresen-Streichert, and S Iwersen-Bergmann. 2020. Revisited: Therapeutic and toxic blood concentrations of more than 1100 drugs and xenobiotics. Additional File 1. *Critical Care* 24(1):195 doi: 10.1186/s13054-020-02915-5.

⁴ Han, E, E Kim, H Hong, S Jeong, J Kim, S In, H Chung, and S Lee. 2012. Evaluation of postmortem redistribution phenomena for commonly encountered drugs. *Forensic Sci Int.* 219(1-3):265-271.

⁵ 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

⁶ FAA. 7/2/21. [AllergyAntihistamineImmunotherapyMedication.pdf \(faa.gov\)](#)

⁷ NIH. NLM. Updated 9/5/19 [DailyMed - ZOLPIDEM TARTRATE tablet, film coated \(nih.gov\)](#)

⁸ Schulz, M, et al. 2020.

⁹ FAA. 7/23/20. *Guide for Aviation Medical Examiners*. Pharmaceuticals (Therapeutic Medications) Sleep Aids. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/pharm/sleepaids/

D. SUMMARY OF MEDICAL FINDINGS

The 66-year-old male pilot held a second class medical certificate with the limitation that he must wear corrective lenses for near and distant vision. At the time of the most recent exam (8/13/18), he reported no medications and having hay fever. According to the autopsy, the cause of the pilot's death was blunt trauma and the manner of death was accident. The medical examiner reported that the pilot's heart was enlarged (500 grams) and the pilot had mild to moderate coronary artery and aortic atherosclerosis. Toxicology testing detected diphenhydramine at 44 ng/mL in the pilot's cavity blood and in his liver tissue, zolpidem in his heart blood and liver tissue, and tadalafil in liver and muscle tissue.