



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

MEDICAL FACTUAL REPORT

October 3, 2017

Nicholas Webster, MD, MPH
Medical Officer

A. ACCIDENT: CEN16FA111 - Navasota, Texas

On February 28, 2016, about 0850 central standard time, a Cirrus SR-20, N477TC, collided with the terrain following a loss of control in Navasota, Texas. The airline transport rated pilot/certificated flight instructor, the uncertified airplane owner receiving instruction, and two passengers were fatally injured. The airplane was substantially damaged. The airplane was registered to Air Akhtar Heating & Air Conditioning LLC and was operated by an individual under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed and no flight plan was filed. The flight originated from the David Wayne Hook Airport (DWH), Spring, Texas, at 0817.

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

Methods

The FAA medical case review, toxicology reports, autopsy reports, were reviewed.

Instructor Pilot - Right Seat

FAA Medical Case Review

According to the FAA medical case review, the 67-year-old instructor pilot's most recent medical certification examination was dated January 15, 2016. The exam documented he was 67 inches tall, weighed 191 pounds, and had accrued a total of 6,500 flight hours. The pilot reported the use of the lipid lowering drug atorvastatin and reported no chronic medical issues other than long term treatment for elevated cholesterol. This drug is not generally considered impairing. The examination did not identify any disqualifying medical conditions and the Aviation Medical Examiner

(AME) issued a second class medical certificate with the limitation "must wear corrective lenses."

Autopsy

According to the Central Texas Autopsy LLC pathologist's autopsy report, the cause of death was multiple blunt force injuries and the manner was accident. The autopsy did not identify any significant natural disease.

Toxicology

NMS Labs toxicology analysis, conducted as part of the autopsy, detected caffeine (a mild stimulant found in coffee and tea) in cavity blood but did not detect any other tested-for-drugs in urine or blood.¹

FAA Bioaeronautical Sciences Research Laboratory did not identify any tested-for-substances in blood or urine.²

Owner Receiving Instruction - Left Seat

FAA Medical Case Review

According to the FAA medical case review, the 53-year-old male pilot's only medical certification examination was dated October 20, 2015. At that time, he was 65 inches tall, weighed 141 pounds, and reported 60 total flight hours. The applicant reported high blood pressure controlled with lisinopril (a prescription blood pressure medication marketed as Prinvil) but no other medical conditions or use of other medications. The pilot reported a complex history of arrests for serious crimes not directly related to drugs or alcohol and the AME deferred certification as a result. The FAA's aeromedical certification division (AMCD) requested additional information which the pilot failed to provide. On January 20, 2016, the FAA's AMCD sent a letter notifying the applicant that they could not determine his eligibility for a medical certificate. As a result, the pilot did not hold a student pilot or medical certificate.

Autopsy

According to the Central Texas Autopsy LLC pathologist's autopsy report, the cause of death was multiple blunt force injuries and the manner was accident. The autopsy did not identify any significant natural disease.

Toxicology³

NMS Labs toxicology analysis, conducted as part of the autopsy, detected diphenhydramine at 78 ng/ml and caffeine in subclavian blood but did not detect any other tested-for-drugs in blood or urine.¹

FAA Bioaeronautical Sciences Research Laboratory detected diphenhydramine in cavity blood at 69 ng/ml and in urine. Naproxen was detected only in urine and no other tested-for-substances were reported.²

¹ The NMS Labs toxicology laboratory tested for the drugs including: alcohol, amphetamines, anticonvulsants, antidepressants, antihistamines, antipsychotic agents, barbiturates, benzodiazepines, cannabinoids, CNS stimulants, cocaine and metabolites, hallucinogens, hypnotic sedatives, hypoglycemics, methadone, muscle relaxants, non-steroidal anti-inflammatory agents, opiates, opioids, phencyclidine, propoxyphene, and salicylates.

² Testing included more than 1300 illicit, prescription, and over the counter drugs and their metabolites, see <http://jag.cami.jccbi.gov/toxicology/default.asp?offset=0> for a complete listing.

³ Drug concentrations are converted to ng/ml or ng/g in this report for consistency between reports to help comparison.

Description of Medications Detected on Toxicology

Caffeine is a mild stimulant found in coffee and tea.⁴

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the trade names Benadryl and Unisom and carries the following FDA warning: may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery). The therapeutic range for diphenhydramine is about 25 to 112 ng/ml.⁵ Blood concentrations following a single dose of 50 mg diphenhydramine in 10 healthy adults produced an average peak plasma concentration of 66 ng/mL at 2.3 hours.⁶ Compared to other antihistamines, diphenhydramine causes marked sedation; 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 50 mg dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100.⁷ However, diphenhydramine undergoes postmortem redistribution which means after death it can move back into pooled blood from storage sites. For diphenhydramine, postmortem central blood average levels may increase by as much as 2.4 times.⁸

Naproxen is an anti-inflammatory analgesic available over the counter and by prescription with the names Aleve and Naprosyn, respectively.⁹ It is generally considered not to be impairing.

D. SUMMARY OF MEDICAL FINDINGS

The right-seated 67-year-old instructor pilot held a current second class medical certificate. He had elevated cholesterol treated with the non-impairing cholesterol lowering medication atorvastatin but reported no other medications or significant medical issues to the FAA. The Central Texas Autopsy LLC pathologist's autopsy determined he died from multiple blunt force injuries and did not identify any significant natural disease. Toxicological testing detected the mild stimulant caffeine.

The left-seated 53-year-old male uncertified pilot's only medical certification examination was conducted October 20, 2015 (about 4 months before the accident). He reported high blood pressure treated with the prescription blood pressure control medication lisinopril. Lisinopril is generally considered not to be impairing. However, his FAA medical certification was deferred by the aviation medical examiner (AME) due to a history of legal issues and later not issued by the FAA due to failure to provide requested information about the legal issues. He was flying with a CFI and was not required to have a pilot or medical certificate.

⁴ National Institutes of Health. US National Library of Medicine. *MedlinePlus* 2017. Caffeine. <https://medlineplus.gov/caffeine.html> Accessed 09/25/2017

⁵ FAA, Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. <http://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=50> Accessed 10/21/2016.

⁶ Baselt RC Disposition of Toxic Drugs and Chemicals in Man, 10th Edition. Diphenhydramine. Pages 684-687 Copyright 2014, Biomedical Publications, Seal Beach, California.

⁷ Weiler JM, et al. 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.

⁸ Han E, et. al., Evaluation of postmortem redistribution phenomena for commonly encountered drugs, *Forensic Science International* 219 (2012) 265–271

⁹ National Institutes of Health. US National Library of Medicine. *DailyMed*. 2017 Naproxen. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=8e150c00-8e5b-40b4-a964-cb70442c2752> Accessed 09/25/2017.

The Central Texas Autopsy LLC pathologist's autopsy determined the left-seated pilot died from multiple blunt force injuries and did not identify any significant natural disease. Toxicology testing by two laboratories identified the mild stimulant caffeine in blood, the non-sedating pain reliever naproxen only in urine, and the sedating antihistamine diphenhydramine in subclavian blood at 78 ng/ml and cavity blood at 68 ng/ml and in urine. The therapeutic range for diphenhydramine is about 25 to 112 ng/ml. Blood concentrations following a single dose of 50 mg diphenhydramine in 10 healthy adults produced an average peak plasma concentration of 66 ng/mL at 2.3 hours. Compared to other antihistamines, diphenhydramine causes marked sedation; 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 50 mg dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100. However, it is subject to postmortem redistribution (movement of drugs from storage sites back into blood after death) and postmortem levels may be elevated by as much as 2.4 times.