



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

December 26, 2017

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Chief Medical Officer

A. ACCIDENT: CEN16FA215; Jonesboro, AR

On June 12, 2016, about 1530 central daylight time, a Robinson Helicopter Company, R44 II helicopter, N789MR, impacted terrain during takeoff from the Classic Airstrip (23AR), near Jonesboro, Arkansas. The pilot, who was the sole occupant, was fatally injured. The helicopter was destroyed during the impact and subsequent ground fire. The helicopter was registered to Floyd Vuncannon Aviation Inc. and was operated by the pilot as a 14 Code of Federal Regulations Part 91 personal flight. Day visual meteorological conditions prevailed at the airport about the time of the accident, and the flight was not operated on a flight plan. The local flight was originating from 23AR at the time of the accident.

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

2. Methods

The FAA medical case review, autopsy report, toxicology findings, sheriff's report, and the investigator's reports were reviewed.

FAA Medical Case Review

According to the FAA files, the 73 year old male pilot reported 6000 total hours of flight experience as of his last medical exam, dated 5/01/2014.

According to the records, he was 68 inches tall, weighed 207 pounds, and had reported no chronic medical conditions and no medication use to the

FAA. He was issued a third class medical certificate limited by a requirement to wear corrective lenses.

Autopsy

According to the autopsy performed by the Arkansas State Crime Laboratory, Medical Examiner Division, the cause of death was multiple blunt force injuries and the manner of death was accident.

Examination of the body for natural disease was limited by the severity of the pilot's injuries; the brain was not available for examination. No significant natural disease was identified.

Toxicology

Toxicology testing performed by the FAA's Bioaeronautical Sciences Research Laboratory identified 0.418 gm/dl of ethanol in cavity blood as well as 0.336 gm/hg in heart muscle, 0.309 gm/hg in lung tissue, 0.182 gm/hg in kidney and 0.152 gm/dl in urine (these units are essentially equivalent based on whether the sample is liquid or solid). In addition, testing identified diphenhydramine in urine and blood (0.049 ug/ml); valsartan in urine and blood, and pioglitazone in urine.

Ethanol is the intoxicant commonly found in beer, wine, and liquor. It acts as a central nervous system depressant. After ingestion, at low doses, it impairs judgment, psychomotor functioning, and vigilance; at higher doses it can cause coma and death. The effects of ethanol on aviators are generally well understood; it significantly impairs pilots' performance, even at very low levels.¹ Federal Aviation Regulations, Section 91.17 (a) prohibits any person from acting or attempting to act as a crewmember of a civil aircraft while having 0.040 gm/dl or more ethanol in the blood.² Ethanol may also be produced in the body after death by microbial activity.³

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under many names including Benadryl and Unisom. Diphenhydramine 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).⁴ The therapeutic range of diphenhydramine is considered 0.0250 to 0.1120 ug/ml; this is the range of blood levels

¹ Cook, C.C., Alcohol and aviation. Addiction (Abingdon, England), 1997. 92(5): p. 539-555.

² US Government Printing Office. eCFR- Code of Federal Regulations. 91.17. <http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=14:2.0.1.3.10.1.4.9>. Accessed 6/16/2017.

³ Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=60> Accessed 03/02/2015

⁴ Federal Aviation Administration. Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. Available from: <http://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=50> . Accessed 11/12/2017.

where psychoactive effects are expected.⁵ Diphenhydramine undergoes post mortem redistribution where after death, the drug can leech from storage sites back into blood. Central post mortem levels may be about two to three times higher than peripheral levels.⁶ Compared to other antihistamines, diphenhydramine causes marked sedation; it is also classed as a CNS 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%.⁷

Valsartan is a prescription blood pressure medication often marketed with the name Diovan. It is not generally considered impairing.⁸ Pioglitazone is a prescription medication for diabetes; it is often marketed with the name Actos. It is not generally considered impairing and does not lead to the development of hypoglycemia.⁹

Sheriff's Report

According to the Craighead County Sheriff's Department incident report, a witness reported seeing the pilot drinking alcohol prior to the accident.

D. SUMMARY OF MEDICAL FINDINGS

The 73 year old male pilot had reported no chronic medical conditions and no medication use to the FAA. According to the autopsy performed by the Arkansas State Crime Laboratory, Medical Examiner Division, the cause of death was multiple blunt force injuries and the manner of death was accident. Post accident toxicology identified 0.418 gm/dl of ethanol in cavity blood as well as 0.336 gm/hg in heart muscle, 0.309 gm/hg in lung tissue, 0.182 gm/hg in kidney and 0.152 gm/dl in urine (these units are essentially equivalent based on whether the sample is liquid or solid). In addition, testing identified diphenhydramine in urine and blood (0.049 ug/ml); valsartan in urine and blood, and pioglitazone in urine. Ethanol is the type of alcohol found in beer, wine, and liquor. Diphenhydramine is a sedating antihistamine available over the counter in multiple products; valsartan is a prescription blood pressure medication and pioglitazone is a prescription medication for diabetes. The latter two drugs are not generally considered impairing. A witness reported seeing the pilot drinking alcohol prior to the accident.

⁵ Federal Aviation Administration. Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50> Accessed 8/9/2016.

⁶ Han E, Kim E, Hong H, Jeong S, Kim J, In S, Chung H, Lee S. Evaluation of postmortem redistribution phenomena for commonly encountered drugs. *Forensic Sci Int.* 2012;219(1-3):265-71.

⁷ 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.

⁸ National Institutes of Health. US National Library of Medicine. DailyMed. Valsartan tablets. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=9402b022-5809-4251-dfef-54f6ef5723fe> Accessed 12/26/2017.

⁹ National Institutes of Health. US National Library of Medicine. DailyMed. Pioglitazone tablets. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ccf82737-754b-472e-a9bb-961fd1a3c307> Accessed 12/26/2017.