



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

October 14, 2020

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Medical Officer

A. ACCIDENT: WPR19FA150; Melba, Idaho

On May 19, 2019, about 1500 mountain daylight time, a Beech C35, N1888D, was substantially damaged following a loss of control and impact with terrain about 1,150 ft west of the departure end of runway 30, Sunrise Skypark Airport (ID40), Melba, Idaho. The airline transport pilot, the sole occupant, was fatally injured. Visual meteorological conditions prevailed for the proposed local flight, which was being operated in accordance with Title 14 *Code of Federal Regulations* Part 91, and no flight plan was filed. The flight was originating at the time of the accident.

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 FAA Forensic Sciences laboratory toxicology¹ reports were reviewed. Other pertinent scientific and regulatory issues were reviewed.

Pilot

FAA Medical Case Review

According to the FAA initial medical case review, the 71-year-old male pilot held an expired third class medical certificate with the limitation that he must wear corrective lenses for near and distant vision. He had applied for basic med on 11/1/18, but those records were not available. At the time of the most recent exam (7/28/11), the pilot reported 20,000 total hours of civil flight

¹ The FAA Forensic Sciences Laboratory tests for more than 1,300 substances including toxins, common prescription and over-the-counter medications as well as illicit drugs. See: <http://jag.cami.jccbi.gov/toxicology/>.

experience and was 68 inches tall and weighed 246 pounds. The pilot reported taking the non-sedating medication lisinopril for high blood pressure.² No significant medical issues were identified by the aviation medical examiner on this or prior exams.

Autopsy

According to the autopsy report from the Owyhee County Coroner's Office, the cause of the pilot's death was severe blunt force trauma due to airplane crash. While the exam was limited by injuries, no significant natural disease was identified.

Toxicology

Postmortem toxicological testing by Coroner's office was positive for ethanol in the pilot's cavity blood at 0.164 grams per deciliter (gm/dL) and liver tissue at 0.110 grams per hectogram (gm/hg).³ The antidepressants duloxetine and trazodone were detected in the pilot's cavity blood at 320 nanograms per milliliter (ng/mL) and 160 ng/mL, respectively. Trazodone and trazodone's active metabolite meta-chlorophenylpiperazine (mCPP) were also detected in his liver tissue.

Similarly, postmortem toxicological testing by the FAA Forensic Sciences laboratory was positive for ethanol in the pilot's cavity blood (0.168 gm/dL), brain tissue (0.094 gm/hg), and muscle tissue (0.103 gm/hg). Duloxetine, trazodone, and mCPP were detected in the pilot's cavity blood (336 ng/mL, 175 ng/mL, and 15 ng/mL, respectively) and in his urine at (141 ng/mL, 227 ng/mL, and 111 ng/mL, respectively). The non-sedating, over-the-counter pain reliever ibuprofen was also detected in urine.

Description of Identified Substances and Medical Conditions

Ethanol

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. Ethanol 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. A small amount of ethanol can be produced after death by microbial activity, usually in conjunction with other alcohols.⁴

Effects of ethanol on aviators are generally well understood; it significantly impairs pilots' performance, even at very low levels.⁵ While the acute effects of ethanol can vary depending on an individual's frequency of use, body weight, and tolerance, in general, at blood ethanol concentrations as low as 0.02 gm/dL there is relaxation and some loss of judgment and at 0.05 gm/dL there is further degradation of judgment, psychomotor functioning, and alertness.⁶ FAA

² National Institutes of Health (NIH). National Library of Medicine. DailyMed. Lisinopril. Updated 9/17/19. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=d45181e7-0eb8-48e3-bbfe-a922b4204e49>

³ Grams per hectogram in tissue samples are directly comparable to grams per deciliter in liquid samples.

⁴ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60>

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

⁶ Centers for Disease Control and Prevention. Blood Alcohol Concentration (BAC). <https://www.cdc.gov/motorvehiclesafety/pdf/bac-a.pdf> Accessed 10/5/2020

regulation 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.⁷

Duloxetine

Duloxetine, commonly marketed as Cymbalta, is a prescription medication used to treat depression, anxiety, and chronic musculoskeletal pain. Duloxetine carries the warning that its use may impair mental and physical ability to perform potentially hazardous tasks. The therapeutic range is 22 to 55 ng/mL and it has a half-life of 8 to 17 hours.^{8,9}

Trazodone

Trazodone is a medication prescribed to treat depression, anxiety, and insomnia. Trazodone can be sedating. It comes with this warning, “Trazodone hydrochloride tablets may cause somnolence or sedation and may impair the mental and/or physical ability required for the performance of potentially hazardous tasks. Patients should be cautioned about operating hazardous machinery, including automobiles, until they are reasonably certain that the drug treatment does not affect them adversely.” Trazodone is metabolized to an active metabolite, mCPP. Trazodone may enhance the response to alcohol, barbiturates, and other CNS depressants. The therapeutic range is 500 to 2,500 ng/mL and it has a half-life of 4 to 7 hours.^{10,11}

Depression

Major depression itself is associated with significant cognitive degradation, particularly in executive functioning.¹² The cognitive degradation may not improve even with remission of the depressed episode, and patients with severe disease are more significantly affected than those with fewer symptoms or episodes.^{13,14} The FAA finds depression and use of antidepressants to be disqualifying, although pilots who can demonstrate they are stable in remission on a small set of medications may be issued a special issuance medical certificate.

D. SUMMARY OF MEDICAL FINDINGS

The 71-year-old male pilot reported taking lisinopril to treat high blood pressure to the FAA on his most recent medical certification exam on 7/28/11. At the time of the accident, he held an

⁷ eCFR- Code of Federal Regulations. 91.17. Current as of 10/1/20. Available from: <http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=14:2.0.1.3.10.1.4.9>

⁸ NIH. US National Library of Medicine. DailyMed. Duloxetine. Updated 9/19/19.

<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0a541d20-5466-433b-a104-40a7b2296076>

⁹ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Duloxetine.

<http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=264>

¹⁰ NIH. US National Library of Medicine. DailyMed. Trazodone hydrochloride tablets. Updated 11/19/19.

<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=71961ab1-951d-1493-f76c-2ff25cca2a85> Updated

¹¹ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Trazodone.

<http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=200>

¹² Snyder HR. 2013. Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: A meta-analysis and review. *Psychol Bull.* 139(1):81-132.

¹³ Nakano Y, Baba H, Maeshima H, Kitajima A, Sakai Y, Baba K, Suzuki T, Mimura M, Arai H. 2008. Executive dysfunction in medicated, remitted state of major depression. *J Affect Disord.* 111(1):46-51.

¹⁴ Paelecke-Habermann Y, Pohl J, Leplow B. 2005. Attention and executive functions in remitted major depression patients. *J Affect Disord.* 89(1-3):125-135.

expired third class medical certificate with the limitation that he must wear corrective lenses for near and distant vision; he had applied for basic med on 11/1/18.

According to the autopsy report from the Owyhee County Coroner's Office, the cause of the pilot's death was severe blunt force trauma due to airplane crash. No significant natural disease was identified.

Postmortem toxicological testing was positive for ethanol in the pilot's cavity blood (0.164 gm/dL and 0.168 gm/dL), liver tissue (0.110 gm/hg), brain tissue (0.094 gm/hg), and muscle tissue (0.103 gm/hg). The antidepressant duloxetine was detected in the pilot's cavity blood (320 ng/mL and 336 ng/mL) and urine (141 ng/mL). The antidepressant trazodone was detected in the pilot's cavity blood (160 ng/mL and 175 ng/mL), liver tissue, and urine (227 ng/mL). Trazodone's active metabolite mCPP was detected in the pilot's cavity blood (15 ng/mL), liver tissue, and urine (111 ng/mL).