



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **September 27, 2021**

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Medical Officer

A. ACCIDENT: ERA21FA194; Middleburg, Florida

Date/Time: April 28, 2021; 9:00 a.m. (EDT)
Aircraft: Beech C-23, N6009U
Injuries: 3 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 and the pilot-rated passenger 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 and pilot-rated passenger's autopsy and Forensic Sciences Laboratory toxicology¹ reports were reviewed. Other relevant medical and regulatory issues were reviewed.

Pilot

FAA Medical Case Review

According to the FAA medical case review, the 77-year-old male pilot had an expired third class medical certificate with the limitation that he must wear corrective lenses. At the time of his most recent FAA medical certification examination (5/29/12), he reported 435 total flight hours and was 72 inches tall and weighed 272 pounds. He reported the use of simvastatin to treat high cholesterol and levothyroxine to treat hypothyroidism. The pilot had applied for Basic Med on 7/29/19.

¹ See <https://jag.camii.jccbi.gov/toxicology/> for a complete list of tested-for substances.

Autopsy

According to the autopsy report from the Office of the Medical Examiner, Jacksonville, Florida, the pilot's cause of death was atlantoaxial dislocation due to blunt impact to head and the manner of death was accident. Soot was identified in his upper airways. With the exception of moderate to severe atherosclerosis of the aorta, no significant natural disease was identified.

Toxicology

FAA Forensic Sciences Laboratory toxicology testing detected the non-impairing local anesthetic medication lidocaine and the high blood pressure medication valsartan in the pilot's heart blood and urine;² carboxyhemoglobin was reported as not detected in his iliac blood. Toxicology testing performed for the Office of the Medical Examiner detected carboxyhemoglobin at 15% in iliac blood; testing was negative for ethanol and tested for drugs in the pilot's heart blood.³

Pilot-rated Passenger

FAA Medical Case Review

According to the FAA medical case review, the 77-year-old male pilot-rated passenger had an expired third class medical certificate with the limitation that he must have available glasses for near vision. At the time of his most recent FAA medical certification examination (3/23/15) he reported 780 total flight hours and was 75 inches tall and weighed 241 pounds. He reported taking no prescription medications or medical conditions. The pilot-rated passenger had applied for Basic Med on 9/5/19.

Autopsy

According to the autopsy report from the Office of the Medical Examiner, Jacksonville, Florida, the pilot-rated passenger's cause of death was cutaneous thermal injuries, inhalation of products of combustion, and blunt traumatic injuries and the manner of death was accident. Soot was identified in his upper airways. With the exception of an enlarged heart (510 grams), no significant natural disease was identified.

Toxicology

FAA Forensic Sciences Laboratory toxicology testing detected the anti-anxiety medication alprazolam at 8 nanograms per milliliter (ng/mL) in the pilot-rated passenger's heart blood and in his liver tissue. The antidepressant sertraline and its metabolite desmethylsertraline were detected in heart blood at 260 ng/mL and 582 ng/mL, respectively; both were also detected in his liver tissue. The over-the-counter motion sickness medication meclizine was detected in his liver

² FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Lidocaine. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=148>

Valsartan. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=286>

³ Carbon monoxide (CO) is a byproduct gas of combustion, such as from an exhaust system or fire.

Carboxyhemoglobin is formed when CO binds to hemoglobin in red blood cells; the degree of carboxyhemoglobin formation is related to the concentration of CO and the duration of exposure. The binding of CO impairs oxygen transport and use, and results in symptoms of exposure that can be mild and vague, such as headache and fatigue, to impairing and incapacitating. While poisoning is considered to have occurred at carboxyhemoglobin levels above 10%, non-smokers living in urban areas may have levels of 5% and heavy smokers can have levels as high as 15%. Severe poisoning is usually associated with levels over 20%. [Smollin, C and K Olson. 2010. Carbon monoxide poisoning (acute). *British Medical Journal Clinical Evidence*. 2010:2013.]

tissue; this medication can cause drowsiness.⁴ The non-impairing gastric reflux medication pantoprazole was detected in his heart blood.⁵ Carboxyhemoglobin was reported as not detected. Toxicology testing performed for the Office of the Medical Examiner detected alprazolam at 9 ng/mL, sertraline at 490 ng/mL, and desmethylsertraline at 530 ng/mL in the pilot-rated passenger's iliac blood. His iliac blood was also positive for caffeine and cotinine (a metabolite of nicotine that indicates tobacco use). Carboxyhemoglobin was detected at 11% in his iliac blood.

Relevant Toxicological and Medical Information

Alprazolam, commonly marketed as Xanax, is a sedating benzodiazepine available by prescription as a controlled substance and used for the acute treatment of generalized anxiety disorder and panic disorder. Alprazolam carries the warning that use may impair the mental and physical ability to perform hazardous tasks. The therapeutic range of alprazolam is 6 to 20 ng/mL in the blood and its half-life is 6 to 20 hours.^{6,7}

Sertraline, commonly marketed as Zoloft, is a prescription medication indicated for the treatment of depression, PTSD, panic disorder, social anxiety disorder and obsessive compulsive disorder. Sertraline carries the warning that use may impair the mental and physical ability to perform hazardous tasks. The therapeutic range of sertraline is 50 to 200 ng/mL. Sertraline has an average half-life of about 26 hours; *desmethylsertraline* has a half-life of 62 to 104 hours.^{8,9} The FAA will consider a special issuance of a medical certificate for depression after 6 months of treatment if the applicant is clinically stable and using only one approved treatment medication. Sertraline is one of the FAA approved antidepressant medications.¹⁰

D. SUMMARY OF MEDICAL FINDINGS

Pilot

The 77-year-old male pilot was on BasicMed; he had an expired third class FAA medical certificate with the limitation that he must wear corrective lenses. At his last FAA medical certification examination on 5/29/12, he reported medications to treat high cholesterol and hypothyroidism. According to the autopsy report, the pilot's death was caused by atlantoaxial dislocation due to blunt impact to head and the manner of death was accident. Soot was identified in his upper airways. With the exception of moderate to severe atherosclerosis of the aorta, no significant natural disease was identified.

⁴ National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). [DailyMed - MECLIZINE 25-mecizine hydrochloride tablet, chewable \(nih.gov\)](#) Updated 8/27/20.

⁵ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Pantoprazole. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=236>

⁶ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Alprazolam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=5>

⁷ NIH. NLM. [DailyMed - ALPRAZOLAM tablet \(nih.gov\)](#) Updated 3/31/21.

⁸ NIH. NLM. [DailyMed - SERTRALINE- sertraline tablet, film coated \(nih.gov\)](#) Updated 3/14/21.

⁹ Lewis, RJ, MK Angier, KS Williamson, and RD Johnson. 2013. Analysis of sertraline in postmortem fluids and tissues in 11 aviation accident victims. *Journal of Analytical Toxicology* 37:208-216.

¹⁰ FAA. Last modified 7/23/18. Guide for Aviation Medical Examiners, Item 47. Psychiatric Conditions - Use of Antidepressant Medications. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/app_process/exam_tech/item_47/amd/antidepressants/

Toxicology testing detected lidocaine and valsartan in the pilot's heart blood and urine. Carboxyhemoglobin was detected by one laboratory at 15% in his iliac blood, carboxyhemoglobin was below the reporting limit by another lab.

Pilot-rated Passenger

The 77 year old male pilot-rated passenger was on BasicMed; he had an expired third class FAA medical certificate with the limitation that he must have available glasses for near vision. At his last FAA medical certification examination on 3/23/15, he reported no prescription medications or medical conditions. According to the autopsy report, the pilot-rated passenger's cause of death was cutaneous thermal injuries, inhalation of products of combustion, and blunt traumatic injuries and the manner of death was accident. Soot was identified in his upper airways. With the exception of an enlarged heart (510 grams), no significant natural disease was identified.

Toxicology testing of samples from the pilot-rated passenger detected alprazolam at 8 ng/mL in heart blood, 9 ng/mL in iliac blood, and in liver tissue. Sertraline was detected at 260 ng/mL in heart blood, 490 ng/mL in iliac blood, and in liver tissue; its metabolite desmethylsertraline was detected at 582 ng/mL in heart blood, 530 ng/mL in iliac blood, and in liver tissue. Meclizine was detected in his liver tissue, pantoprazole was detected in his heart blood, and caffeine and cotinine were detected in iliac blood. Carboxyhemoglobin was detected by one laboratory at 11% in the pilot-rated passenger's iliac blood, carboxyhemoglobin was below the reporting limit by another lab.