NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

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Medical Officer

A. ACCIDENT: ANC15FA050 Trapper Creek, Alaska

On July 19, 2015, about 1915 Alaska daylight time, a Cessna U206G airplane, N734VB, was destroyed after it impacted tree and tundra-covered terrain, following a loss of control while maneuvering at low altitude near Trapper Creek, Alaska. The airplane was being operated by the pilot as a visual flight rules (VFR) local flight under the provisions of Title 14, CFR Part 91, when the accident occurred. The solo commercial pilot was fatally injured. Visual meteorological conditions prevailed, and no flight plan had been filed. The flight departed a private airstrip near Curry Ridge, Alaska.

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

Methods

The pilot's FAA medical certification record, FAA medical case review, toxicology results, autopsy report, and the investigator's report were reviewed.

FAA Medical Certification Record

According to the FAA medical certification record, the 54-year-old commercial pilot received his first medical certificate in 1987. His most recent medical exam was dated January 3, 2013. At that time, he was 71 inches tall, weighed 219 pounds, and reported he had accrued 2,100 total flight hours. He reported a history of cervical fusion in 1991 and no

problems since then. He reported no medication use and the examining physician did not identify any abnormal findings. The FAA Aviation Medical Examiner issued him a Third Class medical certificate without limitations. The certificate was not valid for operations requiring a medical certificate after January 31, 2015.[a]

Autopsy

According to the State of Alaska Medical Examiner's autopsy, the cause of death was multiple blunt force injuries and the manner of death was accident. The heart weighed 400 grams (average for a 190-pound man is 362 grams, range 275-478 grams). No focal lesions were identified in the heart muscle. Scattered areas of 50% narrowing were identified in the left main, proximal left anterior descending, and the left circumflex coronary arteries. In addition, diffuse 50 to 60% narrowing of the mid portion of the right coronary artery with 75 to 85% narrowing more distally was described. Microscopic examination was not conducted. No other significant natural disease was identified.

Toxicology

The FAA Bioaeronautical Laboratory identified diazepam (0.057 ug/ml) and its active metabolite nordiazepam (0.04 ug/ml) in blood.[b] The diazepam metabolites nordiazepam, oxazepam, and temazepam were detected in urine. Additionally, tetrahydrocannabinol was detected in blood (0.0028 ug/ml) and its inactive metabolite tetrahydrocannabinol carboxylic acid was detected in blood (0.0096 ug/ml) and urine (0.1487 ug/ml).

Diazepam is a benzodiazepine anxiolytic prescribed as a Schedule IV controlled substance and commonly marketed under the brand name Valium.[1] It can be used to treat anxiety, vertigo, epileptic seizures, muscle spasms, and to limit the recall of surgery or other invasive procedures. Diazepam may cause reduced concentration, impaired speech patterns and content, and amnesia; some of its effects may last for days. The drug carries a warning that patients treated with diazepam be cautioned against engaging in hazardous occupations requiring complete mental alertness such as driving a motor vehicle.[2] Therapeutic blood concentrations typically range from 0.1-1.0 ug/ml. Following a single oral doses of 10 mg result in diazepam concentrations of 0.2-0.6 ug/ml at 0.5-2 hours, while chronic doses of 30 mg produce steady state diazepam concentrations of 0.7-1.5 ug/ml and nordiazepam concentrations of 0.35-0.53 ug/ml. The half-life of diazepam is 43±13 hours, but ranges from 40-100 hours if the contribution from active metabolites is included.[3]

Tetrahydrocannabinol (THC) is the psychoactive compound found in marijuana. Therapeutic levels may be as low as 0.001 ug/ml.[4] THC has mood altering effects including euphoria, relaxed inhibitions, sense of well-being, disorientation, image distortion, and psychosis. The ability to concentrate and maintain attention are decreased during marijuana use, and impairment of hand-eye coordination is dose-related over a wide range of dosages. Impairment in retention time and tracking, subjective sleepiness, distortion of time and distance, vigilance, and loss of coordination in divided attention tasks have all been reported.

[a] According to the FAA's Guide for Aviation Medical Examiners, a third-class medical certificate is valid for the remainder of the month of issue; plus 24 calendar months for operations requiring a third class medical certificate, if the airman is age 40 or over on or before the date of the examination.

[b] According to a phone conversation between the NTSB medical officer and Alaska Medical Examiner's office, the blood submitted to the FAA Bioaeronautical research laboratory for toxicological analysis was cavity blood.

Users may be able to "pull themselves together" to concentrate on simple tasks for brief periods of time. Significant performance impairments are usually observed for at least one to two hours following marijuana use, and residual effects have been reported up to 24 hours.[5]

D. SUMMARY OF FINDINGS

The pilot had not reported any chronic medical conditions or any medication use to the FAA. His medical certificate had expired 6 months before the accident and at the time of the accident, FAA regulations required him to possess a valid medical certificate to operate the airplane.

The autopsy identified coronary artery disease with scattered areas of 50% narrowing in the left main, proximal left anterior descending, and the left circumflex coronary arteries. Additionally, there was 50 to 60% narrowing of the mid portion of the right coronary artery and 75 to 85% narrowing more distally. However, no focal lesions were identified in the heart muscle.

Toxicology identified diazepam (0.057 ug/ml) and its active metabolite nordiazepam (0.04 ug/ml) in cavity blood. Additionally, tetrahydrocannabinol (THC) was detected in cavity blood (0.0028 ug/ml) and its inactive metabolite tetrahydrocannabinol carboxylic acid (THC-COOH) was found in cavity blood (0.0096 ug/ml) and urine (0.1487 ug/ml).

References

[1] Baselt, Randall. 2014. ***Disposition of Toxic Drugs and Chemicals in Man, Tenth Edition***. Seal Beach, California Biomedical Publications

[2] Drugs.Com, FDA information, Diazepam http://www.drugs.com/pro/diazepam.html Accessed 12/29/2015

[3] National Highway Traffic Safety Administration, Drugs and Human Performance Fact Sheet. Diazepam. http://www.nhtsa.gov/people/injury/research/job185drugs/diazepam.htm Accessed 12/29/2015

[4] Federal Aviation Administration. CAMI toxicology Drug Information for: Tetrahydrocannabinol http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=194 Accessed 12/29/2015

[5] National Highway Traffic Safety Administration. Drugs and Human Performance Fact Sheets. Marijuana. http://www.nhtsa.gov/people/injury/research/job185drugs/cannabis.htm Accessed 12/29/2015