



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

July 8, 2020

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. ACCIDENT: ERA19L263; Russelville, AL

On September 2, 2019, about 0922 central daylight time, a Weatherly Aviation Company 620B, N90104, was destroyed following a collision with power lines and terrain near Russellville, Alabama. The commercial pilot was fatally injured. The flight was operated by the pilot as a Title 14 Code of Federal Regulations Part 137 aerial application flight. Day, visual meteorological conditions prevailed near the accident site, and no flight plan was filed. The local flight originated from a private, grass airstrip about 0915.

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

2. Methods

The FAA medical case review, autopsy report, toxicology findings, and the investigator's reports were reviewed. Relevant regulation and medical literature were reviewed as appropriate.

FAA Medical Case Review

According to the FAA medical case review, the 49 year old male pilot reported 5,500 total civilian flight hours as of his last medical exam, dated 1/17/2019. At that time, he was 67 inches tall and weighed 303 pounds. He had reported no use of medications to the FAA. However, he had previously lost his right eye, which had been replaced by a prosthesis. He had obtained a statement of demonstrated ability (SODA) for monocular

vision. In addition, he had reported having obstructive sleep apnea with the use of a continuous positive airway pressure (CPAP) device to the FAA. At his last exam, he provided a report from 7/2019 that demonstrated 99.7% usage of his CPAP device during the preceding 378 days with an average of 9 hours 12 minutes sleep per night. Average AHI was 2.1.¹ No significant abnormalities were identified on the physical exam and he was issued a special issuance second class medical certificate limited the statement, “Not valid for any class after 1/31/2020.”

Autopsy

According to the autopsy performed by Alabama Department of Forensic Sciences the cause of death was hypertensive cardiovascular disease complicated by blunt force trauma and the manner of death was accident. Although there was a significant post impact fire, there was no soot in the airways. The pathologist remarked that the heart weighed 640 grams with the left ventricular wall and interventricular septum each at 1.8 centimeters in thickness and the right ventricular free wall at 0.6 centimeters in thickness. Average heart weight for a man of his weight is 460 gm with a range from 346 to 602 gm; average wall thickness is 1.3 cm for the left wall and septum and 0.3 cm for the right ventricular wall.² In addition, there was a single area of stenosis of about 50% in the left anterior descending coronary artery. The visual inspection of the heart was otherwise unremarkable; no microscopic evaluation was carried out.

Toxicology

Toxicology testing performed by the FAA’s Forensic Sciences Laboratory identified Carboxy-Delta-9-tetrahydrocannabinol (THC-COOH) at 11.1 ng/mL in cardiac blood and at 66.1 ng/mL in urine. THC-COOH is an inactive metabolite of tetrahydrocannabinol (THC), the primary psychoactive component in marijuana. However, none of the parent compound was identified. An active metabolite, 11-Hydroxy-Delta-9-THC was found in urine at 4.6 ng/mL but was not detected in blood. No carboxyhemoglobin was reported (reporting cutoff is 10%).

Personal medical records

Personal medical records from the pilot’s primary care provider for the 3 years preceding the accident contained only a telephone consult for a referral to his sleep center.

¹ An apneic episode is the complete absence of airflow through the mouth and nose for at least 10 seconds. A hypopnea episode is when airflow decreases by 50 percent for at least 10 seconds or decreases by 30 percent if there is an associated decrease in the oxygen saturation or an arousal from sleep. The apnea-hypopnea index (AHI) sums the frequency of both types of episodes per hour. An AHI of less than 5 is considered normal. An AHI of 5-15 is mild; 15-30 is moderate and more than 30 events per hour is considered severe sleep apnea.

² Kitzman DW, Scholz DG, Hagen PT, Ilstrup DM, Edwards WD. Age-related changes in normal human hearts during the first 10 decades of life. Part II (Maturity): A quantitative anatomic study of 765 specimens from subjects 20 to 99 years old. Mayo Clinic Proc., 1988. 63(2): 137-46.

Description of substances: tetrahydrocannabinol (THC) is the primary psychoactive cannabinoid compound. THC's mood-altering effects include euphoria and relaxation. In addition, marijuana causes alterations in motor behavior, perception, cognition, memory, learning, endocrine function, food intake, and regulation of body temperature. Specific performance effects include decreased ability to concentrate and maintain attention. Impairment in retention time and tracking, subjective sleepiness, distortion of time and distance, vigilance, and loss of coordination in divided attention tasks have been reported. Significant performance impairments are usually observed for at least 1-2 hours following marijuana use, and residual effects have been reported up to 24 hours.³

THC is rapidly metabolized but the rate of metabolism is not linear and depends on the means of ingestion (smoking, oil, and edibles), potency of the product, frequency of use, and user characteristics. The primary metabolite, 11-hydroxy-delta-9-THC, is equally psychoactive, but is rapidly metabolized to the non-psychoactive metabolite THC-COOH.

D. SUMMARY OF MEDICAL FINDINGS

The 49 year old male pilot had reported monocular vision with use of a prosthesis for his right eye to the FAA and obtained a statement of demonstrated ability (SODA) for monocular vision. In addition, he had reported having obstructive sleep apnea with the use of a continuous positive airway pressure (CPAP) device to the FAA. At his last exam, he provided a report from 7/2019 that demonstrated 99.7% usage of his CPAP device during the preceding 378 days with an average of 9 hours 12 minutes sleep per night. Average AHI was 2.1 with use of the device.

According to the autopsy performed by Alabama Department of Forensic Sciences, the cause of death was hypertensive cardiovascular disease complicated by blunt force trauma and the manner of death was accident. Although there was a significant post impact fire, there was no soot in the airways. The pathologist remarked the heart weighed 640 grams with the left ventricular wall and interventricular septum each at 1.8 centimeters in thickness and the right ventricular free wall at 0.6 centimeters in thickness. Average heart weight for a man of his weight is 460 gm with a range from 346 to 602 gm; average wall thickness is 1.3 cm for the left wall and septum and 0.3 cm for the right ventricular wall. In addition, there was a single area of stenosis of about 50% in the left anterior descending coronary artery. The visual inspection of the heart was otherwise unremarkable; no microscopic evaluation was carried out.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified Carboxy-Delta-9-tetrahydrocannabinol (THC-COOH) at 11.1 ng/mL in cardiac blood and at 66.1 ng/mL in urine. THC-COOH is an inactive metabolite of tetrahydrocannabinol

³ National Highway Traffic Safety Administration. April 2014. Drugs and Human Performance Fact Sheets. Cannabis/Marijuana. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>

(THC), the primary psychoactive component in marijuana. However, none of the parent compound was identified. An active metabolite, 11-Hydroxy-Delta-9-THC was found in urine at 4.6 ng/mL but was not detected in blood. No significant carboxyhemoglobin was reported (reporting cutoff is 10%).

Personal medical records from the pilot's primary care provider for the 3 years preceding the accident contained only a telephone consult for a referral to his sleep center.