



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

April 13, 2021

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Chief Medical Officer

A. ACCIDENT: CEN20FA010; Aberdeen, SD

Date and time: October 9, 2019; 2235 CDT

Injuries: 1 fatality

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 70 year old male pilot reported 100 total flight hours as of his last medical exam, dated 2/11/2019. At that time, he was 71 inches tall and weighed 179 pounds. He reported no chronic medical problems and no use of medications to the FAA. No significant abnormalities were identified on the physical exam but the certificate was deferred because of a previous revocation of both his student pilot certificate and medical certificate in 2017 (see below). After review, on 3/21/2019, the FAA issued a third class medical and student pilot certificate without limitations.

In 2017, the pilot had had his student pilot and medical certificates revoked for performing unauthorized cross-country flights and falsifying a reviewer's signature. He had never obtained a pilot certificate of any type.

In addition, on 10/3/2019, a report was made to the FAA hotline regarding the pilot having cognitive problems and unreported medical issues as well as unsafe piloting behaviors. Although the FAA requested a medical re-exam by mail, the fatal accident occurred before any other interventions occurred.

Autopsy

According to the autopsy performed by the University of North Dakota Forensic Pathology, the cause of death was multiple blunt force injuries and the manner of death was accident. During the autopsy, an implantable medical device was identified in the left anterior chest wall with leads extending into the neck towards the head.

Toxicology

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified cetirizine (151 ng/ml); citalopram (573 ng/ml) and its metabolite N-desmethylocitalopram; bupropion (549 ng/ml) and its metabolite hydroxybupropion; and trazodone (110 ng/ml) in heart blood. All of these substances were also identified in liver tissue.

Medication Descriptions

Cetirizine is a sedating antihistamine commonly available with the name Zyrtec. FAA rules require a wait of 5 dosing intervals (5 days in this case) between last use and flight. The range of drug levels thought to be associated with systemic effects is between 190 and 1,450 ng/ml.¹

Citalopram is an antidepressant often marketed with the name Celexa. It carries the following warning, "In studies in normal volunteers, citalopram in doses of 40 mg/day did not produce impairment of intellectual function or psychomotor performance. Because any psychoactive drug may impair judgment, thinking, or motor skills, however, patients should be cautioned about operating hazardous machinery, including automobiles, until they are reasonably certain that citalopram therapy does not affect their ability to engage in such activities."² Typical blood levels where psychoactive

¹ Federal Aviation Administration. CAMI toxicology drug information. Cetirizine. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=131> Accessed 4/9/2021.

² National Institutes of Health. US National Library of Medicine. DailyMed. Citalopram. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=2632b547-2e13-447f-ac85-c774e437d6a8> Accessed 4/9/2021.

effects would be expected when citalopram is used alone are between 50 and 110 ng/ml.³

Bupropion is another antidepressant (often marketed as Wellbutrin) which is also used to support smoking cessation (often marketed as Zyban for this purpose). It is known to increase the risk of seizures in a dose related way, and providers are asked to, “Advise patients that any central nervous system-active drug like bupropion ... may impair their ability to perform tasks requiring judgment or motor and cognitive skills. Advise patients that until they are reasonably certain that bupropion ... (does) not adversely affect their performance, they should refrain from driving an automobile or operating complex, hazardous machinery.”⁴ Typical blood levels where psychoactive effects would be expected when bupropion is used alone are between 10 and 143 ng/ml.⁵

Trazodone is another antidepressant, well known to also cause sedation. It carries this warning, “Trazodone hydrochloride 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.”⁶ Trazodone is thought to have psychoactive effects at blood levels between 500 and 2500 ng/ml when used alone.⁷

All three of these antidepressants’ drug information also contains warnings concerning exacerbation of depression, or the development of other psychiatric symptoms including mania and hypomania. Bupropion carries specific warnings about the potential for developing psychotic symptoms such as hallucinations and delusions.

Vagal Nerve Stimulator

Vagal nerve stimulators are implanted devices, usually placed into the upper left chest, with electrodes that extend to wrap the vagal nerve as it passes through the neck. Initially used to attempt to control epilepsy in patients with persistent seizures on maximal medications, these devices

³ Federal Aviation Administration. CAMI toxicology drug information. Citalopram. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=208> Accessed 4/9/2021.

⁴ National Institutes of Health. US National Library of Medicine. DailyMed. Bupropion. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=cf69c6c4-d2d8-4a41-aff8-a67abd3a037e> Accessed 4/9/2021.

⁵ Federal Aviation Administration. CAMI toxicology drug information. Bupropion. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=20> Accessed 4/9/2021.

⁶ National Institutes of Health. US National Library of Medicine. DailyMed. Trazodone. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ed3039d8-3d27-4b71-a4b0-812943c9457f> Accessed 4/9/2021.

⁷ Federal Aviation Administration. CAMI toxicology drug information. Trazodone. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=200> Accessed 4/9/2021.

are now sometimes used to attempt to improve symptoms in treatment resistant depression. The effectiveness of this device for this indication is controversial.⁸

D. SUMMARY OF MEDICAL FINDINGS

The 70 year old student pilot had not reported any chronic medical conditions or use of any medications to the FAA. The pilot had previously (2017) had his student pilot license and medical certificate revoked by the FAA for performing unauthorized cross-country flights and falsifying a reviewer's signature. However, he had reapplied in 2019 and been granted a student pilot and third class medical certificate. A hotline report had been made to the FAA 6 days before the accident indicating the pilot may have had cognitive problems and unreported medical issues as well as unsafe piloting behaviors.

According to the autopsy performed by the University of North Dakota Forensic Pathology, the cause of death was multiple blunt force injuries, and the manner of death was accident. During the autopsy, an implantable medical device was identified in the left anterior chest wall with leads extending into the neck towards the head.

Toxicology testing identified cetirizine (151 ng/ml); citalopram (573 ng/ml) and its metabolite N-desmethylocitalopram; bupropion (549 ng/ml) and its metabolite hydroxybupropion; and trazodone (110 ng/ml) in heart blood. All of these substances were also identified in liver tissue.

⁸ Flavia R. Carreno and Alan Frazer, Vagal Nerve Stimulation for Treatment-Resistant Depression. *Neurotherapeutics*. 2017; 14(3): 716–727.