

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



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MEDICAL

Specialist's Factual Report

April 5, 2023

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A. ACCIDENT

Location: Fulshear, Texas
Date: December 21, 2021

B. MEDICAL SPECIALIST

Specialist Turan Kayagil, MD, FACEP
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C. DETAILS OF THE INVESTIGATION

1.0 Purpose

This investigation was performed to evaluate the pilot of the Cessna 208B airplane (Cessna pilot) and the pilot of the Dudek Paragliders Solo 21 powered paraglider (paraglider pilot) for potentially impairing medical conditions and potentially impairing substances.

2.0 Methods

The Federal Aviation Administration (FAA) medical case review and the autopsy and toxicology reports of the Cessna pilot and paraglider pilot were reviewed. Selected pre-crash personal medical records of the Cessna pilot were also reviewed, as were selected investigator reports and relevant regulation and medical literature.

D. FACTUAL INFORMATION

1.0 Cessna Pilot

1.1 FAA Medical Case Review

According to the FAA medical case review, the 35-year-old male Cessna pilot had his last aviation medical examination on June 14, 2021. At that time, he reported 3,500 total civilian flight hours. He was 67 inches tall and weighed 216 pounds. He reported no medication use. He reported a prior history of anxiety due to legal issues and family stress, and the FAA medical case review notes he had received trazodone (a prescription medication that can be used to treat depression, anxiety, and insomnia) for a short time during 2008. The Cessna pilot reported a 2008 Air Force court-martial with confinement and dishonorable discharge. According to the FAA medical case review, in 2011 the Cessna pilot was issued an FAA Letter of Eligibility

for medical certification for anxiety and legal issues. No significant issues were identified at the Cessna pilot's last aviation medical examination, and he was issued a first-class medical certificate without limitation.

1.2 Autopsy

The Fort Bend County Medical Examiner Office performed the Cessna pilot's autopsy. According to the Cessna Pilot's autopsy report, his cause of death was multiple blunt force trauma and his manner of death was accident. The ability of the autopsy examination to evaluate for natural disease was extremely limited by the extent of traumatic injury; the Cessna pilot's brain, heart, and lungs were not identified.

1.3 Toxicology

1.3.1 FAA Toxicology Results

The FAA Forensic Sciences laboratory performed toxicological testing of postmortem specimens from the Cessna pilot.¹ In muscle tissue, ethanol was detected at 0.022 g/dL and quetiapine was also detected. A second muscle tissue specimen was tested for ethanol with a negative result (ethanol not detected).² No blood was available for FAA testing.

1.3.2 Descriptions of Detected Substances

Ethanol is a type of alcohol. It is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.³ FAA regulation imposes strict limits on flying after consuming ethanol, including prohibiting pilots from flying with a blood ethanol level of 0.04 g/dL or greater.⁴ However, consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can be produced by microbes in a person's body after death. Postmortem ethanol production is made more likely by extensive traumatic injury and can cause an affected toxicological specimen to test positive for ethanol while another specimen from the same person tests negative.⁵

¹ The FAA Forensic Sciences laboratory has the capability to test for around a thousand substances including toxins, prescription and over-the-counter medications, and illicit drugs. Some of these substances are listed at <https://jag.cami.jccbi.gov/toxicology>.

² According to an e-mail from an FAA Forensic Toxicologist, the FAA uses a 0.01 g/dL reporting cutoff for ethanol.

³ Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

⁴ [14 Code of Federal Regulations § 91.17](#).

⁵ Kugelberg FC, Jones AW. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Sci Int*. 2007;165(1):10-29. doi:10.1016/j.forsciint.2006.05.004.

Quetiapine, sometimes marketed as Seroquel, is a prescription antipsychotic medication. In the United States, quetiapine is approved by the Food and Drug Administration (FDA) for treating schizophrenia. Quetiapine is also FDA-approved for treating acute episodes of mania and depression in bipolar disorder, and as part of chronic multi-drug treatment of bipolar disorder. Additionally, quetiapine is approved as part of multi-drug treatment of major depressive disorder. Quetiapine is regularly prescribed for off-label (non-FDA-approved) uses, including in low doses for treatment of insomnia without underlying psychiatric illness. Some other possible off-label uses include chronic single-drug treatment of bipolar disorder, as well as treatment of post-traumatic stress disorder and anxiety.⁶⁻¹²

Quetiapine commonly causes drowsiness, especially in the initial days after starting a treatment regimen. This is a result of the drug's sedating antihistamine effects, to which users may develop tolerance over time. Quetiapine also has multiple other potential adverse side effects. The drug typically carries a warning that it has the potential to impair judgment, thinking, and motor skills, and that users should be cautioned about performing activities requiring mental alertness, such as operating a motor vehicle or hazardous machinery, until they are reasonably certain that the drug does not affect them adversely.^{6,13} The FAA considers quetiapine to be a "do not

⁶ National Institutes of Health National Library of Medicine. Seroquel. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0584dda8-bc3c-48fe-1a90-79608f78e8a0>. Updated January 27, 2022. Accessed March 30, 2023.

⁷ Stovall J. Bipolar mania and hypomania in adults: choosing pharmacotherapy. In: Post TW, ed. *UpToDate*. Waltham, MA: UpToDate Inc. <https://www.uptodate.com/contents/bipolar-mania-and-hypomania-in-adults-choosing-pharmacotherapy>. Updated July 29, 2022. Accessed March 30, 2023.

⁸ Shelton RC, Bobo WV. Bipolar major depression in adults: choosing treatment. In: Post TW, ed. *UpToDate*. Waltham, MA: UpToDate Inc. <https://www.uptodate.com/contents/bipolar-major-depression-in-adults-choosing-treatment>. Updated May 19, 2022. Accessed March 30, 2023.

⁹ Post RM. Bipolar disorder in adults: choosing maintenance treatment. In: Post TW, ed. *UpToDate*. Waltham, MA: UpToDate Inc. <https://www.uptodate.com/contents/bipolar-disorder-in-adults-choosing-maintenance-treatment>. Updated May 17, 2022. Accessed March 30, 2023.

¹⁰ Thase ME. Quetiapine monotherapy for bipolar depression. *Neuropsychiatr Dis Treat*. 2008;4(1):11-21.

¹¹ Neubauer DN. Pharmacotherapy for insomnia in adults. In: Post TW, ed. *UpToDate*. Waltham, MA: UpToDate Inc. <https://www.uptodate.com/contents/pharmacotherapy-for-insomnia-in-adults>. Updated December 19, 2022. Accessed March 30, 2023.

¹² Modesto-Lowe V, Harabasz AK, Walker SA. Quetiapine for primary insomnia: consider the risks. *Cleve Clin J Med*. 2021;88(5):286-294. doi:10.3949/ccjm.88a.20031.

¹³ Jibson MD. Second-generation antipsychotic medications: pharmacology, administration, and side effects. In: Post TW, ed. *UpToDate*. Waltham, MA: UpToDate Inc. <https://www.uptodate.com/contents/second-generation-antipsychotic-medications-pharmacology-administration-and-side-effects>. Updated May 11, 2022. Accessed March 30, 2023.

issue/do not fly" medication.¹⁴ According to the FAA medical case review for this accident, quetiapine is unacceptable for FAA medical certification because of the underlying conditions it is used to treat.

In addition to being used medicinally, quetiapine has emerged as a potential drug of misuse and abuse. Commonly, abuse of quetiapine involves its use in combination with recreational substances such as cocaine, marijuana, alcohol, benzodiazepines, or opioids. Users may seek to enhance those substances' desired effects or to self-medicate for undesired symptoms caused by substance use or withdrawal. Some people may abuse quetiapine seeking effects of hypnosis or euphoria, although the drug's ability to produce a pleasurable "high" in the absence of other recreational drugs is not clear. People also sometimes misuse or abuse quetiapine seeking relief from anxiety or insomnia.^{12 - 17}

1.4 Pre-Crash Medical Records

The Cessna pilot's personal medical records from the clinic where he received primary care were reviewed from a period of 3 years before the crash date. The Cessna pilot's most recent encounter was a telemedicine encounter in August 2021 related to a resolving acute gout flare in his toe. At that time, his usual medications were documented as being a multivitamin, a fish oil supplement, and as-needed ibuprofen and acetaminophen; he was also given a prescription for indomethacin (a non-steroidal anti-inflammatory medication) to be used as needed in case of a future gout flare. None of these medications are generally considered impairing. Reviewed medical records contained no mention of quetiapine.

The pilot had a documented medical history of gout (with one prior flare in 2016) and seasonal/environmental allergies. Reviewed medical records did not document any diagnosis of a psychiatric disorder, any active psychiatric symptoms, or any substance abuse history. A past problem list contained an entry for "insomnia due to stress"; no further related information was included, and this entry was not present

¹⁴ Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) do not issue - do not fly. Federal Aviation Administration website. <https://www.faa.gov/go/dni>. Updated March 8, 2023. Accessed March 30, 2023.

¹⁵ Mattson ME, Albright VA, Yoon J, Council CL. Emergency department visits involving misuse and abuse of the antipsychotic quetiapine: results from the Drug Abuse Warning Network (DAWN). *Subst Abuse*. 2015;9:39-46. doi:10.4137/SART.S22233.

¹⁶ Kim S, Lee G, Kim E, Jung H, Chang J. Quetiapine misuse and abuse: is it an atypical paradigm of drug seeking behavior? *J Res Pharm Pract*. 2017;6(1):12-15. doi:10.4103/2279-042X.200987.

¹⁷ Klein L, Bangh S, Cole JB. Intentional recreational abuse of quetiapine compared to other second-generation antipsychotics. *West J Emerg Med*. 2017;18(2):243-250. doi:10.5811/westjem.2016.10.32322.

in the note from the most recent encounter. The same past problem list also documented “no psychiatric diagnosis or condition on Axis I.”¹⁸

2.0 Paraglider Pilot

2.1 FAA Medical Case Review

According to the FAA medical case review, the 51-year-old male paraglider pilot had no FAA medical certification file. Operators of ultralight vehicles are not required to have FAA medical certification.¹⁹

2.2 Autopsy

The Fort Bend County Medical Examiner Office performed the paraglider pilot’s autopsy. According to the paraglider pilot’s autopsy report, his cause of death was blunt force injuries and his manner of death was accident. The autopsy examination was somewhat limited by the extent of injuries. Within this limitation, the autopsy did not identify significant natural disease.

2.3 Toxicology

The FAA Forensic Sciences laboratory performed toxicological testing of postmortem specimens from the paraglider pilot. No tested-for substances were detected.¹ There was no blood available for FAA testing.

E. SUMMARY OF MEDICAL FACTS

1.0 Cessna Pilot

The 35-year-old male Cessna pilot had his last aviation medical examination on June 14, 2021. At that time, he reported no medication use. He reported a prior history of anxiety due to legal issues and family stress, and a 2008 court-martial with dishonorable discharge from the Air Force. He had used the antidepressant/sleep aid medication trazodone for a short time in 2008, and had been issued an FAA Letter of Eligibility for medical certification for anxiety and legal issues in 2011. No significant issues were identified at the Cessna pilot’s last aviation medical examination, and he was issued a first-class medical certificate without limitation.

¹⁸ In this context, “Axis I” denotes mental health disorders such as mood, anxiety, behavioral, and substance use disorders, not including personality disorders and intellectual disability.

¹⁹ [14 Code of Federal Regulations 103.7\(b\)](#).

According to the Cessna Pilot's autopsy report, his cause of death was multiple blunt force trauma and his manner of death was accident. The ability of the autopsy examination to evaluate for natural disease was extremely limited by the extent of traumatic injury; the brain, heart, and lungs were not identified. The Cessna pilot's postmortem toxicological testing detected the prescription antipsychotic medication quetiapine in his muscle tissue. Ethanol was detected in one muscle specimen at 0.022 g/dL but was not detected in another muscle specimen.

The Cessna pilot's primary care medical records from a period of 3 years before the crash date did not document any use of quetiapine, the presence of any psychiatric disorder, or any history of substance abuse.

2.0 Paraglider Pilot

The 51-year-old male paraglider pilot had not applied for FAA medical certification. According to his autopsy report, his cause of death was blunt force injuries and his manner of death was accident. His autopsy did not identify significant natural disease. His postmortem toxicological testing did not detect any tested-for substances.

Submitted by:

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