



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

July 22, 2022

Turan Kayagil, MD, FACEP
Medical Officer

A. ACCIDENT INFORMATION

Identification: WPR21FA340

Location: Lake Havasu City, Arizona

Date: September 12, 2021

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 Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and toxicology reports were reviewed. Selected investigator reports and relevant regulation and medical literature were also reviewed.

3. Findings

a. FAA Medical Case Review

According to the FAA medical case review, the 64-year-old male pilot's last aviation medical examination was on February 4, 2020. At that time, he reported 1343 total civilian flight hours. He was 76 inches tall and weighed 248 pounds. He reported using the medications piroxicam (a prescription anti-inflammatory medication commonly used to treat arthritis-related pain), famotidine (a stomach-acid suppressing medication available over the counter), pravastatin (a prescription medication commonly used to help control cholesterol and reduce cardiovascular risk), and testosterone gel (a prescription

topical medication commonly used to supplement low testosterone hormone). Those medications generally are not considered impairing. He reported a history of seasonal/environmental allergies, acid reflux, and shingles. No significant issues were identified, and he was issued a third-class medical certificate limited by a requirement to wear corrective lenses.

b. Autopsy

The Mohave County Medical Examiner's Office performed the pilot's autopsy. According to the autopsy report, the cause of death was multiple blunt force and thermal injuries, and the manner of death was accident. The autopsy did not identify any significant natural disease.

c. Toxicology

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the pilot.¹ Tramadol was detected at 165 ng/mL in cavity blood, and was also present in urine. The tramadol metabolite O-desmethyltramadol was detected in cavity blood and urine. Hydrocodone was also detected in cavity blood (at a level too low to quantify) and in urine. The hydrocodone metabolites hydromorphone and dihydrocodeine were detected in urine but not in cavity blood. Diphenhydramine was detected at 122 ng/mL in cavity blood, and was also present in urine. Acetaminophen was detected in cavity blood and urine. Loratadine was detected in cavity blood but not urine. The loratadine metabolite desloratadine was detected in cavity blood and urine.

d. Descriptions of Detected Substances

Tramadol is a prescription opioid pain medication; O-desmethyltramadol is its main active metabolite.² Hydrocodone is another prescription opioid medication that can be used to treat pain and suppress cough.^{3,4} Hydromorphone and

¹ The FAA Forensic Sciences Laboratory tests specimens for over 1,300 substances including toxins, prescription and over-the-counter medications, and illicit drugs.

² National Institutes of Health National Library of Medicine. Ultram. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=45f59e6f-1794-40a4-8f8b-3a9415924468>. Updated June 7, 2022. Accessed June 15, 2022.

³ National Institutes of Health National Library of Medicine. Hydrocodone bitartrate. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f7b55d14-0980-b680-8ceb-7489ff65455e>. Updated May 20, 2021. Accessed June 15, 2022.

⁴ National Institutes of Health National Library of Medicine. Tussionex Pennkinetic. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=af2caf33-e587-4d80-9523-44e1b565aae2>. Updated January 20, 2017. Accessed June 15, 2022.

dihydrocodeine are metabolites of hydrocodone (and are also available as prescription opioid medications).^{5,6}

Tramadol and hydrocodone each typically carries a warning that it may impair mental or physical abilities needed to perform potentially hazardous activities such as driving a car or operating machinery, and that users should be warned not to drive or operate dangerous machinery unless they are tolerant to the effects of the drug and know how they will react to it. Opioids like tramadol and hydrocodone are Drug Enforcement Administration controlled substances with potential for abuse and dependence.^{2,3} An open prescription for an opioid is generally disqualifying for FAA medical certification, although certification may be granted by FAA decision in certain cases of infrequent opioid use for acceptable medical conditions. Regardless, the FAA states that a pilot should not fly after using an opioid medication until adequate time has elapsed for the medication to be eliminated from circulation.⁷

Diphenhydramine is a sedating antihistamine available over the counter in multiple cold and allergy products as well as sleep aids. Diphenhydramine can cause cognitive and psychomotor slowing and drowsiness. It typically carries a warning that it may impair performance of tasks like driving and operating heavy machinery.^{8,9,10} The FAA states that pilots should not fly within 60 hours of using diphenhydramine, to allow time for it to be eliminated from circulation.^{7,11}

⁵ National Institutes of Health National Library of Medicine. Dilaudid. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=3afae8b9-bb24-447a-bc7f-041c8326a438>. Updated February 28, 2017. Accessed June 15, 2022.

⁶ National Institutes of Health National Library of Medicine. Trezix. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a519a201-bcfd-4029-9bdf-fc3e03f975ac>. Updated February 3, 2021. Accessed June 15, 2022.

⁷ 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 February 19, 2021. Accessed June 15, 2022.

⁸ National Institutes of Health National Library of Medicine. Benadryl Allergy Liqui-Gels. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=bfeae100-e2d1-4607-be3b-2d9b15cd4f7f>. Updated November 15, 2021. Accessed June 15, 2022.

⁹ Weiler JM, Bloomfield JR, Woodworth GG, et al. Effects of fexofenadine, diphenhydramine, and alcohol on driving performance: a randomized, placebo-controlled trial in the Iowa driving simulator. *Ann Intern Med*. 2000;132(5):354-363. doi:10.7326/0003-4819-132-5-200003070-00004.

¹⁰ Moskowitz H, Wilkinson CJ. *Antihistamines and Driving-Related Behavior: A Review of the Evidence for Impairment*. National Highway Traffic Safety Administration. DOT HS 809 714. May 2004. <https://www.nhtsa.gov/sites/nhtsa.gov/files/antihistamines20text.pdf>. Accessed June 15, 2022.

¹¹ Federal Aviation Administration. Allergy – antihistamine & immunotherapy medication. Guide for Aviation Medical Examiners. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/media/AllergyAntihistamineImmunotherapyMedication.pdf. Updated July 28, 2021. Accessed June 15, 2022.

Acetaminophen is a medication that is available in a wide variety of over-the-counter products as a pain and fever reducer.¹² It also may be combined with tramadol or hydrocodone in some prescription pain control products.^{13,14} Loratadine is a non-sedating antihistamine medication that is available over the counter and can be used to treat allergy symptoms and hives.¹⁵ Desloratadine is an active metabolite of loratadine, and is available as prescription medication with similar uses as loratadine.¹⁶ Acetaminophen, loratadine, and desloratadine generally are not considered impairing.

D. SUMMARY OF MEDICAL FINDINGS

The 64-year-old male pilot's last aviation medical examination was on February 4, 2020. At that time, he reported using the medications piroxicam, famotidine, pravastatin, and testosterone gel. Those medications generally are not considered impairing. He reported a history of seasonal/environmental allergies, acid reflux, and shingles. No significant issues were identified, and he was issued a third-class medical certificate limited by a requirement to wear corrective lenses.

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¹² National Institutes of Health National Library of Medicine. Tylenol Regular Strength. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=511536b2-6cbd-463e-b2db-6feec474cf6b>. Updated November 8, 2017. Accessed June 15, 2022.

¹³ National Institutes of Health National Library of Medicine. Tramadol hydrochloride and acetaminophen. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ef1ddb8e-80d1-4f59-8935-4e6be7b3eff5>. Updated December 29, 2020. Accessed June 15, 2022.

¹⁴ National Institutes of Health National Library of Medicine. Norco. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=566bd196-3c0c-4f05-9e2e-4803ad3126d4>. Updated February 9, 2010. Accessed June 15, 2022.

¹⁵ National Institutes of Health National Library of Medicine. Claritin. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=660ac9df-f1b1-4c89-94dd-9fae0a013f3c>. Updated February 10, 2020. Accessed June 15, 2022.

¹⁶ National Institutes of Health National Library of Medicine. Clarinex. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=c671342e-69a2-4ca5-abc2-8166ed4240d4>. Updated June 1, 2021. Accessed June 15, 2022.