



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

December 23, 2016

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. ACCIDENT: ERA15FA353; Oneida, TN

On September, 12, 2015, about 1625 eastern daylight time, an Aero Vodochody L-39C Albatros, N139RT, operated by a private individual, was destroyed when it impacted terrain shortly after takeoff from Scott Municipal Airport (SCX), Oneida, Tennessee. The airline transport pilot was fatally injured. Visual meteorological conditions prevailed and no flight plan had been filed for the local airshow performance flight that was conducted under the provisions of 14 Code of Federal Regulations Part 91.

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

2. Methods

The FAA blue ribbon medical file, FAA medical case review, toxicology results, autopsy report, and the investigator's reports were reviewed.

FAA Medical File and Medical Case Review

According to the FAA files, the 61 year old male pilot in this accident reported 6,000 total flight hours as of his last medical exam, dated 12/23/2014. At that time, he was 70 inches tall and weighed 227 pounds. He had reported a complicated medical history and long list of medications to the FAA. he received a limited second class/full third class special issuance medical certificate which stated, "Must wear lenses for distant - possess glasses for near vision. Limited second class/full third

class privileges. Not valid for carrying passengers or cargo for compensation except if serving as pilot of a fully qualified 2-pilot crew. Not valid for any class after 12/31/2015.”

The pilot received his first medical certificate and student pilot certificate in October 1992. At that time, he reported no medical conditions and no medications. He then had a myocardial infarction (MI, a heart attack) in November, 1992 at age 38. He reported this and related diagnoses of hypertension and high cholesterol to the FAA and thereafter annually obtained special issuance third class medical certificates after providing additional medical information including the results of an annual stress-exercise test.

The pilot’s FAA required stress test in 1997 was positive although he had no symptoms. Further evaluation led to a cardiac catheterization. During the catheterization extensive, severe, coronary artery disease was identified in multiple vessels. In December 1997 he underwent a 6 vessel coronary artery bypass graft surgery. After recovering and providing the results of the surgery and follow up cardiac evaluations to the FAA, the pilot was issued time-limited third class special issuance medical certificate in August, 1998. In September, 2001, the certificate was upgraded to limited second class/full third class status with the same limitations as above. He maintained his medical certificate in this status thereafter.

At the time of his last medical exam, he reported the above conditions along with previous unrelated surgical procedures and his use of the following medications: fenofibrate, atorvastatin, niacin, omega-3 fatty acids, indapamide, nifedipine, lisinopril, and atenolol.

Fenofibrate, atorvastatin, niacin, and omega-3 fatty acids all treat high cholesterol, attacking the lipid system in different ways.^{1,2,3,4} They are commonly marketed with the names Tricor, Lipitor, Niaspan, and Lovaza. Indapamide, nifedipine, lisinopril, and atenolol are all indicated for the

¹ National Institutes of Health. US National Library of Medicine. DailyMed. Metoprolol tablets. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=3a69e15a-eda6-4a6e-8934-6881e4370521> Accessed 12/23/2016.

² National Institutes of Health. US National Library of Medicine. DailyMed. Atorvastatin <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=6ccdb6f3-22c7-5b48-46bc-ce4a4c65eb4d> Accessed 12/23/2016.

³ National Institutes of Health. US National Library of Medicine. DailyMed. Niacin. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=15fc2066-525b-4ebf-ae51-0eddd90489b5> Accessed 12/23/2016.

⁴ National Institutes of Health. US National Library of Medicine. DailyMed. Lovaza. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5ada82f0-a5fd-46c9-aecc-f106f614c9f0> Accessed 12/23/2016.

treatment of high blood pressure.⁵⁶⁷⁸ Atenolol also reduces the risk of recurrent heart attacks.

Autopsy

According to the autopsy performed by the Regional Forensic Center, Knox County, the cause of death was multiple blunt force injuries following airplane crash.

Examination of the body for natural disease was limited by the severity of the pilot's injuries; the brain, heart, and most other organs were not available for examination.

Toxicology

Toxicology testing performed by NMS labs at the request of the medical examiner identified 0.064 gm/dl of ethanol and caffeine in muscle tissue.

Toxicology testing performed by the FAA's Bioaeronautical Research Laboratory was limited by the lack of available blood, urine, or vitreous for testing. No ethanol was identified in muscle. However, diphenhydramine and metoprolol were detected in muscle and brain.

Ethanol is the intoxicant commonly found in beer, wine, and liquor. It acts as a central nervous system depressant. After ingestion, at low doses, it impairs judgment, psychomotor functioning, and vigilance; at higher doses it can cause coma and death. The effects of ethanol on aviators are generally well understood; it significantly impairs pilots' performance, even at very low levels.⁹ Federal Aviation Regulations, Section 91.17 (a) prohibits any person from acting or attempting to act as a crewmember of a civil aircraft while having 0.040 gm/dl or more ethanol in the blood.¹⁰ Because ingested alcohol is distributed throughout the body, levels from different post mortem tissues are usually similar. Ethanol may also be

⁵ National Institutes of Health. US National Library of Medicine. DailyMed. Indapamide tablets. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=788ebfde-39a2-42a4-9bd6-34ad87f66a97> Accessed 12/23/2106.

⁶ National Institutes of Health. US National Library of Medicine. DailyMed. Nifedipine capsule. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=9e5df4e1-be0d-4026-a7b0-3679b1effbde> Accessed 12/23/2106.

⁷ National Institutes of Health. US National Library of Medicine. DailyMed. Lisinopril tablets. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=27ccb2f4-abf8-4825-9b05-0bb367b4ac07> Accessed 12/23/2106.

⁸ National Institutes of Health. US National Library of Medicine. DailyMed. Atenolol. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f36d4ed3-dcbb-4465-9fa6-1da811f555e6> Accessed 12/23/2106.

⁹ Cook, C.C., Alcohol and aviation. Addiction (Abingdon, England), 1997. 92(5): p. 539-555.

¹⁰ US Government Printing Office .eCFR- Code of Federal Regulations. 91.17. <http://www.ecfr.gov/cgi-bin/text-idx?rgn=div8&node=14:2.0.1.3.10.1.4.9>. Accessed 12/16/2016.

produced in body tissues by microbial activity after death.¹¹ When ethanol develops after death levels in different tissues may vary considerably.

Caffeine is the central nervous system stimulant found in tea, coffee, and cola.

Metoprolol is a beta-blocking agent similar to atenolol described above, used to treat high blood pressure and reduce the risk of recurrent heart attacks.¹²

Diphenhydramine is a sedating antihistamine used to treat allergy symptoms and as a sleep aid. It is available over the counter under the trade names Benadryl and Unisom. Diphenhydramine carries the following FDA warning: may impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery).¹³ Compared to other antihistamines, diphenhydramine causes marked sedation; it is also classed as a CNS depressant and this is the rationale for its use as a sleep aid. Altered mood and impaired cognitive and psychomotor performance may also be observed. In fact, in a driving simulator study, a single dose of diphenhydramine impaired driving ability more than a blood alcohol concentration of 0.100%.¹⁴

D. SUMMARY OF MEDICAL FINDINGS

The 61 year old pilot had a history of hypertension, high cholesterol, and severe coronary artery disease which had required a 6 vessel bypass grafting surgery in 1997. He reported all these diagnoses to the FAA and reported the use of fenofibrate, atorvastatin, niacin, omega-3 fatty acids, indapamide, nifedipine, lisinopril, and atenolol. He held a limited second/full third class special issuance medical certificate. The autopsy was limited by the absence of most organs for examination. Toxicology testing in one lab identified 0.064 gm/dl of ethanol and caffeine in muscle tissue. A second lab did not identify any ethanol in muscle. However, diphenhydramine and metoprolol were detected in muscle and brain.

¹¹ Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60> Accessed 12/02/2016.

¹² National Institutes of Health. US National Library of Medicine. DailyMed. Metoprolol tablets. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5ef12832-15cd-40f4-bf11-6cea7e48ff7f> Accessed 12/23/2016.

¹³ Federal Aviation Administration. Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50>. Accessed 11/12/2016.

¹⁴ Weiler JM, B.J., Woodworth GG, Grant AR, Layton TA, Brown TL, McKenzie DR, Baker TW, Watson GS., 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):354-63.