



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

December 22, 2016

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Chief Medical Officer

A. ACCIDENT: ERA15LA349; Atlantic Ocean

On September 10, 2015, about 1445 eastern daylight time, a Mooney M20T, N370MM, sustained substantial damage when it impacted the Atlantic Ocean off the coast of Atlantic City, New Jersey. The commercial pilot was fatally injured. Day visual meteorological conditions prevailed and an instrument flight rules flight plan had been filed for the personal flight. The flight was conducted under the provisions of Title 14 Code of Federal Regulations Part 91. The flight originated from Gaylord Regional Airport (GLR), Gaylord, Michigan, around 1220, with an intended destination of Atlantic City International Airport (ACY), Atlantic City, New Jersey.

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 F FAA medical case review, toxicology results, autopsy report, and the investigator's reports were reviewed.

FAA Medical Case Review

According to the FAA files, the 68 year old male pilot reported 4,824 total flight hours as of his last medical exam, dated 10/26/2013. At that time, he was 68 inches tall and weighed 194 pounds. He had reported hay fever, kidney stones with a history of lithotripsy and ureteral stents (now removed), and a partial right knee replacement to the FAA. Reported

current medications at the time of his last exam were: finasteride, chlorthalidone, allopurinol, aspirin, and vitamins. At his last exam the pilot was issued a third class medical certificate without restrictions.

Finasteride is a prescription medication that treats the symptoms of prostatic hypertrophy and male pattern baldness and is commonly marketed with the names Proscar and Propecia.^{1,2} Chlorthalidone is a diuretic prescription blood pressure medication that may decrease the recurrence of kidney stones.³ Common names are Hygroton and Thalitone. Allopurinol is a prescription medication to prevent episodes of gout that may also help prevent kidney stones.⁴ Aspirin is an anti-inflammatory, antiplatelet drug available over the counter.

Autopsy

According to the autopsy performed by the Office of the State Medical Examiner, Southern Regional Medical Examiner Office, the cause of death was blunt injuries and the manner of death was accident. No significant natural disease was identified.

Toxicology

The State of New Jersey, State Toxicology Laboratory identified 0.029 % of ethanol in chest cavity blood and 0.014 % ethanol in bile.

Toxicology testing performed by the FAA's Bioaeronautical Research Sciences Laboratory identified 0.026 gm% of ethanol in cavity blood but no ethanol in brain or muscle. In addition, chlorthalidone and diphenhydramine were identified in liver and cavity blood. The level of diphenhydramine in cavity blood was 0.071 ug/ml.

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.⁵ Federal Aviation Regulations, Section 91.17 (a)

¹ National Institutes of Medicine. US National Library of Medicine. DailyMed. Finasteride film coated. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=adfb8f6b-a7bb-4ac2-b2aa-fec6d56630ad> Accessed 12/22/2016.

² National Institutes of Medicine. US National Library of Medicine. DailyMed. Finasteride tablet. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=81b424d3-8418-4497-9395-59eae6755230> Accessed 12/22/2016.

³ National Institutes of Medicine. US National Library of Medicine. DailyMed. Chlorthalidone. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=15dd224a-87ad-48dc-80b1-e8382a452c4c> Accessed 12/22/2016.

⁴ National Institutes of Medicine. US National Library of Medicine. DailyMed. Allopurinol <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=a80fe56f-8d03-423f-8e2a-7ec8c9e5045b> Accessed 12/22/2016.

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

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.⁶ Because ingested alcohol is distributed throughout the body, levels from different post mortem tissues are usually similar. Ethanol may also be produced in body tissues by microbial activity after death.⁷ In this case, levels in different tissues may vary considerably.

Chlorthalidone is described above. 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 warning, “May impair mental and/or physical ability required for the performance of potentially hazardous tasks (e.g., driving, operating heavy machinery).”⁸ 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%.⁹

The therapeutic range for diphenhydramine is 0.0250 to 0.1120 ug/ml.¹⁰ Diphenhydramine undergoes post mortem redistribution; after death, the drug can leech from storage sites back into blood. As a result, central post mortem levels may be about two to three times higher than peripheral levels.¹¹

⁶ 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 6/16/2016.

⁷ Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60> Accessed 12/02/2016

⁸ Federal Aviation Administration. Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. Available from: <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50>. Accessed 11/12/2013.

⁹ 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): p. 354-63.

¹⁰ Federal Aviation Administration. Civil Aerospace Medical Institute. Toxicology Drug Information: Diphenhydramine. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=50> Accessed 8/9/2016.

¹¹ Han E, Kim E, Hong H, Jeong S, Kim J, In S, Chung H, Lee S. Evaluation of postmortem redistribution phenomena for commonly encountered drugs. Forensic Sci Int. 2012;219(1-3):265-71.

D. SUMMARY OF MEDICAL FINDINGS

The 68 year old male pilot had reported hay fever, kidney stones, and orthopedic surgery to the FAA as well as his use of medications including finasteride, chlorthalidone, allopurinol, aspirin, and vitamins. No significant natural disease was identified at autopsy. The New Jersey State Toxicology Laboratory identified 0.029 gm/dl of ethanol in chest cavity blood and 0.014 gm/dl ethanol in bile. The FAA's Bioaeronautical Research Sciences Laboratory identified 0.026 gm/dl of ethanol in cavity blood but no ethanol in brain or muscle. In addition, chlorthalidone and diphenhydramine were identified in liver and cavity blood. The level of diphenhydramine in cavity blood was 0.071 ug/ml.