



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

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A. ACCIDENT: ERA20LA076; Nashua, New Hampshire

On January 15, 2020, about 1450 eastern standard time, an experimental amateur-built Magni M-24Plus gyroplane, N327JD, was substantially damaged during takeoff from Boire Field Airport (ASH), Nashua, New Hampshire. The sport pilot sustained serious injuries. The airplane was privately owned and operated under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a personal flight. Visual meteorological conditions prevailed in the area and no flight plan was filed for the local flight.

B. GROUP IDENTIFICATION

No group was formed for the medical evaluation in this accident.

C. DETAILS OF INVESTIGATION

Purpose

This investigation was performed to evaluate the pilot for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

Methods

The Federal Aviation Administration (FAA) medical certification files, FAA Forensic Sciences laboratory toxicology¹ report, and post-accident medical records were reviewed. Other pertinent scientific and regulatory issues were reviewed.

Pilot

FAA Medical Certification File

According to the FAA medical certification file, the 69-year-old male pilot held an expired third class medical certificate with the limitation that he must wear corrective lenses. He had received a special issuance for secondary polycythemia that also expired on 8/31/18. He had applied for BasicMed on 11/18/18, but those records were not available.

¹ The FAA Forensic Sciences Laboratory tests for more than 1,300 substances including toxins, common prescription and over-the-counter medications as well as illicit drugs. See: <http://jag.cami.jccbi.gov/toxicology/>.

At the time of the most recent and only exam (8/1/16), the pilot reported no hours of civil flight experience and was 74 inches tall and weighed 206 pounds. The pilot reported taking lisinopril (a high blood pressure medication), omeprazole (a medication to treat gastric reflux), fluticasone (a nasal steroid spray for allergies), pravastatin (a high cholesterol medication), meloxicam (a non-steroidal anti-inflammatory medication), and Androgel (testosterone). Supporting documentation for his special issuance revealed he was also taking alfuzosin (a medication used to treat an enlarged prostate) and loratadine (a non-sedating antihistamine commonly marketed as Claritin). The pilot reported having hypertension, gastroesophageal reflux, hay fever/allergies, diabetes controlled by diet and exercise (hemoglobin A1C was 6.1%),² ankylosing spondylitis,³ and a history of testicular cancer that required surgery. Documentation from his rheumatologist revealed that the pilot received immunosuppressive drug infusions for his ankylosing spondylitis. At the pilot's medical certification examination, it was reported under physical examination findings that he had limited range of motion in his cervical spine and limited waist flexion. Treatment for the testicular cancer had resulted in the secondary polycythemia that was treated with periodic phlebotomies.⁴

Toxicology

Toxicological testing by the FAA Forensic Sciences laboratory on the pilot's hospital admission blood detected the sedating antihistamine cetirizine at 124 nanograms per milliliter (ng/mL); alfuzosin (a non-sedating medication used to treat an enlarged prostate)⁵ and ondansetron were also detected in his blood.

Cetirizine is a second-generation antihistamine used to relief hay fever and allergy symptoms. It is available over the counter, commonly marketed as Zyrtec. Although designed to be less sedating, cetirizine does have some sedating properties. The therapeutic range is between 190 and 1,450 ng/mL; the elimination half-life is between 6.5 and 10 hours. FAA provides guidance on wait times before flying after using this medication.^{6,7}

Ondansetron is a prescription medication commonly marketed as Zofran. It is indicated for use in preventing nausea and vomiting from chemotherapy, radiation therapy, or surgery; however, it is

² Hemoglobin A1C is a measure of the percentage of hemoglobin molecules that have a glucose molecule attached to them. The test measures the average blood glucose over the past three months. Above 6.5% indicates diabetes. [National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). MedlinePlus. A1C.

<https://medlineplus.gov/a1c.html> Page last updated 4/22/20]

³ Ankylosing spondylitis, also known as rheumatoid spondylitis, is a type of arthritis that affects the spine. Inflammation between vertebrae can cause pain, stiffness, and lead to spinal fusion and a limited range of motion. [NIH. NLM. MedlinePlus. Ankylosing Spondylitis. <https://medlineplus.gov/ankylosingspondylitis.html> Page last updated 12/7/20]

⁴ Secondary polycythemia is a condition where there is an overproduction of red blood cells in response to an underlying condition or medication. Polycythemia increases a person's chance of getting blood clots. [National Health Service (UK). <https://www.nhs.uk/conditions/polycythaemia/> Page last reviewed 4/30/19]

⁵ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Alfuzosin.

<https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=277>

⁶ FAA. 11/13/19. What over-the-counter (OTC) medications can I take and still be safe to fly? OK-20-0302

https://www.faa.gov/licenses_certificates/medical_certification/media/OTCMedicationsforPilots.pdf

⁷ FAA. Updated 1/16/19. Forensic Toxicology Drug Information. Cetirizine.

<https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=131>

frequently prescribed for off-label purposes. Ondansetron's side effects may include fatigue and dizziness.⁸

Androgel is indicated for testosterone replacement therapy in men who have conditions that do not allow their bodies to produce its own testosterone. The use of Androgel can cause an overproduction of red blood cells (secondary polycythemia) which may increase the risk of blood clotting events (thromboembolism). There have been reports of users having deep vein thrombosis (DVT) and pulmonary embolisms. Some studies have also shown that Androgel users have an increased risk of heart attacks, stroke, and cardiovascular death.⁹

Personal Medical Records

Post-accident hospital records were obtained for the pilot. The pilot was brought by ambulance to the hospital where he was diagnosed with unstable spinal fractures that required fusion. According to the history the pilot provided to various medical staff, he recalled having difficulty controlling the plane for take-off and drifted off the runway and crashed; he did not remember the exact details and was unsure if he had lost consciousness. He denied having symptoms of lightheadedness, chest pain, or palpitations prior to take-off. The pilot reported his medical history as bilateral testicular cancer and surgery, high cholesterol, gastroesophageal reflux, ankylosing spondylitis, chronic kidney disease, and obstructive sleep apnea. In the emergency room, he reported that his current medications included amlodipine, pravastatin, alfuzosin, and Zyrtec.

In the emergency room, among other intravenous medications, the pilot received hydromorphone for pain and ondansetron to prevent nausea and vomiting. His laboratory results were non-detect for blood alcohol and no other drugs were tested for. He had a cardiac work-up that was normal: his electrocardiogram showed no acute changes or arrhythmia, troponin was negative, and his transthoracic echocardiogram showed normal cardiac function.

At admission, computed tomography (CT) of the pilot's head showed no acute intracranial processes. Two days later, the CT showed a 1.4 cm hypodensity. Subsequent magnetic resonance imaging (MRI) showed multifocal areas in his brain with subacute infarcts. Magnetic resonance angiography (MRA) of his carotid and neck showed normal blood flow without vascular abnormalities and MRA of his head was grossly normal. The pilot had a normal electroencephalogram. The pilot's discharge diagnosis included cerebral infarction.

A cerebral infarction or cerebrovascular accident, commonly referred to as a stroke, happens when there is a loss of blood flow to part of the brain. This more commonly happens when a blood clot blocks a blood vessel but can also happen from a broken blood vessel. Without blood flow to provide oxygen and nutrients, the brain cells die which can cause brain damage or even death. People develop symptoms based on what area of the brain is deprived of blood flow. Symptoms often develop suddenly and can include numbness or weakness of the face, arm, or leg; confusion; difficulty speaking; trouble seeing; severe headache; and loss of coordination.

⁸ NIH NLM. DailyMed. Ondansetron. Updated 1/13/19.

<https://www.dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=2edc0788-dc38-4d21-ba8e-71f159e2d3b1>

⁹ NIH NLM. DailyMed. Androgel-testosterone gel. Updated 4/20/20.

<https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=c506aaa3-04f8-4eb1-8dc4-e964cdd08e7f#s29>

Risk factors for stroke include high blood pressure, diabetes, abnormal heart rhythms, high cholesterol, and obesity. The risk of having a stroke increases with age.¹⁰

D. SUMMARY OF MEDICAL FINDINGS

The 69-year-old male pilot held an expired third class medical certificate with the limitation that he must wear corrective lenses; he had applied for BasicMed on 11/18/18. The pilot had received a special issuance for secondary polycythemia that resulted from testosterone replacement therapy required after his testicular cancer and surgery. The pilot was reported taking medications for high blood pressure, high cholesterol, gastric reflux, an enlarged prostate (alfuzosin), and allergies. He had diabetes controlled by diet and exercise. The pilot received immunosuppressive drug infusions for his ankylosing spondylitis.

The pilot was admitted to the hospital for spinal fusion of fractures received from the accident. The pilot reported that he did not remember the exact details of his accident and was unsure if he had lost consciousness. Follow-up computed tomography and magnetic resonance imaging of the head and brain two days after the accident revealed that the pilot had experienced a cerebral infarction.

Toxicological testing by the FAA Forensic Sciences laboratory on the pilot's hospital admission blood detected the sedating antihistamine cetirizine at 124 ng/mL, alfuzosin, and ondansetron. In the emergency room, the pilot had received intravenous ondansetron.

¹⁰ NIH. NLM. MedlinePlus. Stroke. <https://medlineplus.gov/stroke.html> Page last updated 12/24/20.