WPR11MA454

FACTUAL MEDICAL INFORMATION

The following information was reviewed by J. Michael Duncan M.D., Chief Medical Officer for the National Transportation Safety Board regarding the accident pilot in the case referenced above.

The following information was obtained from the **FAA Aerospace Medical Certification Division**:

> The accident pilot was issued a Class 2 medical certificate with no limitations on March 2, 2010. The accident pilot denied the use of medications and denied any history of medical, psychiatric, or drug or alcohol conditions. The aviation medical examiner (AME) did however note that the accident pilot used alprostadil (Caverject) rarely for erectile dysfunction. At the time of the examination, he weighed 192 lbs and his height was 71 inches with a calculated body mass index (BMI) of 26.8. The AME commented in the Explanations section of the FAA Form 8500-8 – "seems in good health."

The following information was obtained from the accident pilot's **personal medical records**:

> Medical records dating from January 1, 2007, to the latest record on file were requested by subpoena from the accident pilot's family physician.
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> The first medical entry obtained was dated May 14, 2007. At that time, active diagnoses included hyperlipidemia (elevated cholesterol), mild benign prostatic hypertrophy (enlarged prostate), and elevated homocysteine (independent risk factor for heart disease). He had been prescribed atorvastatin (Lipitor), 20 mg daily, and ezetimibe (Zetia), 10 mg daily, to lower blood cholesterol with "excellent control" as noted by his doctor. He had also been prescribed aspirin, 81 mg daily, and the vitamin Metanx. [Note: One tablet of Metanx contains L-methylfolate calcium (3 mg), pyridoxal 5'-phosphate (35 mg), and methylcobalamin (2 mg).] His blood pressure was 141/80 mmHg with a pulse of 61 bpm. Weight was 188 lbs. He was to return in six months for a routine appointment.
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> The accident pilot returned to see his doctor on November 28, 2007. No changes in medications were noted at that time. Additional diagnoses that were being considered included chronically low platelets, carotid stenosis (narrowing), and mitral insufficiency (heart valve). A carotid ultrasound and an echocardiogram were ordered.
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> A follow up appointment occurred on December 26, 2007. In part, the medical record entry for that date reads…"He also had a recent 2D Echo which showed both ventricles of normal size and function, although he did have a little bit of mild concentric left ventricular hypertrophy with some trivial aortic sclerosis without stenosis, mild dilatation [of aortic root], mild mitral regurgitation and mild pulmonary hypertension with his estimated pulmonary artery pressure at 35. Because of that we went ahead and did an ambulatory O2 SAT [pulse oximetry] and

interestingly enough, he was 92 percentile on room air, but after a short amount of exertion, he dropped way down to 76 percentile. Based on this and his history of flying, he has flown at times in the past for a length of time above 10,000 feet, which could make him hypoxic, we are going to go ahead and refer him to a pulmonologist for further workup…." The echocardiogram was dated December 3, 2007. The carotid ultrasound report, also dated December 3, 2007, stated "mild bilateral atherosclerotic disease with no sonographic evidence of significant stenosis affecting either carotid arterial system."

The accident pilot never made an appointment to see the pulmonologist as was confirmed by subpoenaing the pulmonologist's medical records. Those records revealed that the pulmonologist's office attempted to contact the accident pilot beginning on January 8, 2008. That office left voicemail messages every three days on the accident pilot's phone until February 18, 2008. The pulmonologist's office then notified the accident pilot's family physician on February 18, 2008, that they had been unsuccessful in making contact to schedule an appointment. On February 21, 2008, the pulmonologist's office spoke with the accident pilot's wife. She stated that her husband had been out of town. She thought that her husband and spoken with the family physician about the testing. The last entry in the pulmonologist's medical record on February 25, 2008, reads "Mr. (name redacted) called said he was not going to do NPSG [nocturnal polysomnography] or consult. Patient said he had discussed this with Dr. (name redacted), and he would contact him when he was ready to proceed."

The next entry in the accident pilot's family physician medical record was dated January 8, 2009. The record states, in part, "The patient is here for a 9-month follow-up visit. He has a history of hyperlipidemia, elevated homocyst[e]ine level, hypoxia secondary to obstructive sleep apnea, pulmonary hypertension. He has been doing reasonably well." The accident pilot denied any symptoms of chest pain, shortness of breath, cough, or swelling. The physical examination showed no clubbing of the digits (bulbous deformity of the ends of the fingers), cyanosis (blueness of the lips or fingers), or edema (swelling of the feet and ankles). Auscultation (listening with a stethoscope) of the heart was normal. Office spirometry and electrocardiogram (EKG) on January 8, 2009, were read as normal. No mention was made in the medical record on that date of ordering another echocardiogram however one was obtained on January 9, 2009. The pulmonary artery pressure on that study was estimated at 24 mmHg. The family physician offered supplemental oxygen therapy to the accident pilot on January 8, 2009, but he declined. The only documented O2 SAT (pulse oximetry) in the accident pilot's medical record is from the appointment on December 26, 2007.

The accident pilot was seen throughout 2009 by his family physician. He had a physical examination on January 8, 2010. Office spirometry (pulmonary function testing) was read as normal. EKG showed a sinus rhythm with a single premature ventricular contraction and occasional atrial premature contractions. He remained on atorvastatin, ezetimibe, aspirin, and Metanx. By the end of 2010 the ezetimibe had been stopped.

The medical record entry on December 17, 2010, listed the medications as atorvastatin, 30 mg daily, aspirin, 81 mg daily, and Metanx. Blood work obtained that day showed white blood cell count of 4,900 cells/microliter, hemoglobin 13.9 g/dL, hematocrit 41.6%, platelet count 141,000 per microliter, glucose 104 mg/dL, cholesterol 182 mg/dL, triglycerides 150 mg/dL, prostate specific antigen (PSA) of 4.16 ng/mL, and hemoglobin A1C 5.1%. Follow up PSA on January 31, 2011, was 2.18 ng/mL. The glucose normal reference range was 65-100 mg/dL. All other values listed above were in the normal reference range.

The last recorded office visit the accident pilot had with his family physician was June 8, 2011, for symptoms of an upper respiratory infection.

The following information was obtained from a **phone conversation between the NTSB Chief Medical Officer and the family physician** on February 27, 2012:

In general, the family physician thought of the accident pilot as being in good general health and fitness for his age. He was surprised by the post-exertion oxyhemoglobin desaturation given the presumed level of fitness of the accident pilot. The medical entry dated January 8, 2009, of "hypoxia secondary to obstructive sleep apnea" was the family doctor's concern, or working diagnosis, to be either proven or ruled out. He had no sleep study to support the concern as the accident pilot declined to see the pulmonologist for further testing. He felt that the pulmonary hypertension of 35 mmHg on the echocardiogram from December 3, 2007, was over estimated by the interpreting physician. He believed the estimate of pulmonary artery pressure on the January 9, 2009, echocardiogram to be more accurate because of his confidence in the interpreting physician (different from the one in 2007). Additionally, he found no evidence on physical examination or EKG consistent with pulmonary hypertension and he could not elicit a history of symptoms that might suggest pulmonary hypertension or chronic hypoxemia. The family physician intimated that the accident pilot marched to the beat of his own drum but that he was an appreciative patient.

The following information was obtained from the **accident pilot's autopsy**, performed by the Washoe County Medical Examiner's Office, Reno, Nevada:

The accident pilot's remains were identified by fingerprint comparison, dental comparison, and DNA comparison. The manner of death was an accident. The cause of death was listed as "multiple blunt force injuries due to a single aircraft collision." The remains were extensively fragmented. Skeletal muscle was positive for ethanol and methanol. (See next section.) The Medical Examiner interpreted these results as "contamination by aviation fuel."

The following information was obtained from the **FAA Forensic Toxicology Laboratory at CAMI:**

Ethanol, 58 mg/dL, and methanol, 234 mg/dL (or 2.34 mg/ml), were detected in muscle. No other drugs or chemicals were detected in muscle. Carbon monoxide and cyanide were not assayed as blood was not submitted for analysis.

Additional detail regarding the above detected drugs from *FAA/CAMI Forensic Toxicology's WebDrugs* (http://jag.cami.jccbi.gov/toxicology/):

Ethanol is produced postmortem in the putrefaction process. Ethanol is also a social drug. It is a central nervous system depressant and after ingestion and absorption is distributed throughout all body tissues and fluids. FAR Section 91.17 (a) prohibits any person from acting or attempting to act as a crewmember of a civil aircraft while having 0.040 g/dL (40.0 mg/dL) or more alcohol in the blood.

Methanol is produced postmortem, along with ethanol and other alcohols, in the putrefaction process. Methanol, commonly known as wood alcohol, is metabolized to formaldehyde. If ingested, the toxic and lethal levels of methanol are 10 mg/ml and 150 mg/ml, respectively.

Additional information provided by the **NTSB IIC**:

The fuel used by the accident aircraft did not contain ethanol or methanol. The accident aircraft had a modified "boil-off" cooling system that contained methanol. There were alcohol (i.e., ethanol) containing beverages in the box seat area of the viewing stands where the accident aircraft impacted the ground. The accident aircraft accelerometer saturated at greater than 9 +Gz in less than one second during the initial part of the accident sequence.

SUMMARY:

This 74 year old male accident pilot died of multiple blunt force injuries on September 16, 2011, after the aircraft he was racing crashed into the box seating area killing 10 spectators. During the initial part of the accident sequence, the accident aircraft accelerometer saturated at greater than 9 +Gz in less than one second. His Class 2 medical certificate had been issued 18 months previously with no limitations. No disqualifying medical, psychiatric, drug or alcohol conditions, or medication use were admitted to by the accident pilot or identified by the AME at the time of the examination with the exception of alprostadil (Caverject) used rarely for erectile dysfunction. The AME further noted that the accident pilot seemed to be in good health. The accident pilot did however have hyperlipidemia and an elevated homocysteine level for which he had been prescribed atorvastatin, ezetimibe, aspirin, and Metanx. None of these medications were identified in the postmortem toxicological analysis. Ethanol and methanol were however identified in muscle on postmortem toxicology.