

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



ERA22LA220

MEDICAL

Specialist's Factual Report

January 31, 2023

A. ACCIDENT

Location: Tybee Island, Georgia
Date: May 6, 2022
Time: 08:44 Local
Airplane: Cirrus Design Corp SR22; N24LA

B. MEDICAL SPECIALIST

Specialist Michelle Watters, MD, PhD, MPH
National Transportation Safety Board, RE-1
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C. DETAILS OF THE 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 case review, the pilot's autopsy and FAA Forensic Sciences Laboratory toxicology reports,¹ and personal medical records were reviewed. Other relevant medical and regulatory issues were reviewed.

D. FACTUAL INFORMATION - PILOT

1.0 FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 67-year-old male pilot was on BasicMed (6/26/21). His most recent FAA medical certification exam was on 6/15/20. At that exam, the pilot was 71 inches tall and weighed 194 pounds. He reported having 1,884 civil flight hours. He reported taking metoprolol for high blood pressure and pravastatin to treat high cholesterol. The pilot reported a history of ablation for atrial fibrillation with a loop recorder implanted in 2019 for which he had received an FAA authorization for special issuance. He was issued a third class medical certificate with the limitation that he must have available glasses for near vision that expired in June 2021.

¹ The FAA Forensic Sciences Laboratory has the capability to test for more than 1,300 substances including toxins, common prescription and over-the-counter medications, and illicit drugs.
<https://jag.cami.jccbi.gov/toxicology/>

2.0 Autopsy

According to the autopsy report from the Division of Forensic Sciences, Georgia Bureau of Investigation, Coastal Regional Medical Examiner's Office, Pooler, Georgia, the cause of death in the pilot was drowning and the manner of death was accident. A history of heart palpitations was listed as other significant conditions. A recorder device was removed from the pilot's left upper chest. No cardiac anatomic abnormalities or trauma were identified.

3.0 Toxicology

Toxicological testing performed by the FAA's Forensic Sciences Laboratory detected ethanol in the pilot's heart blood at 0.116 grams per deciliter (gm/dL), kidney tissue at 0.098 grams per hectogram (gm/hg), spleen tissue at 0.152 gm/hg, and brain tissue at 0.097 gm/hg.² N-propanol and n-butanol were detected in his heart blood and kidney, spleen, and brain tissue. Isopropanol was also detected in his heart blood. The tissue specimens were noted to exhibit putrefaction. Metoprolol was detected in his heart and liver tissues; this high blood pressure medication is generally considered non-impairing.³

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. It acts as a central nervous system depressant; it impairs judgment, psychomotor functioning, and vigilance. Ethanol is water soluble, and after absorption it quickly and uniformly distributes throughout the body's tissues and fluids. The distribution pattern parallels water content and blood supply of the tissue. Ethanol can be produced after death by microbial activity, sometimes in conjunction with other alcohols such as propanol and butanol.⁴ Postmortem ethanol concentrations in blood samples have been positively correlated with the number of days before body recovery at sea.⁵

4.0 Personal Medical Records

Pre-event medical records were obtained for the pilot. The pilot's most recent visit to his cardiologist occurred a few weeks before the accident on 4/18/22. The pilot had diagnoses of mitral valve prolapse, mitral valve regurgitation, status post ablation of atrial fibrillation, and premature atrial contractions. The pilot denied heart palpitations, chest pain, dizziness, lightheadedness, and syncope. His physical exam

² Grams per hectogram in tissue samples are directly comparable to grams per deciliter in liquid samples.

³ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Metoprolol. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=171>

⁴ Kugelberg, FC and AW Jones. 2007. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Science International* 165(1):10-29.

⁵ Cullen SA and RW Mayes. 2005. Alcohol discovered in the urine after death: Ante-mortem ingestion or post-mortem artefact? *Medicine Science and the Law* 45(3):196-200.

was normal aside from his heart murmur. His cardiologist interpreted his downloaded loop recording as no episodes of atrial fibrillation. His echocardiogram performed that day was reported as stable since 2011 and showed an ejection fraction of 60-65%. The pilot was taking metoprolol for heart rate and blood pressure management and pravastatin for high cholesterol. His cardiologist reported that there were no signs of recurrent atrial fibrillation and that the pilot was "doing extremely well"; the pilot's follow-up appointment was in one year.

The pilot's most recent visit to his primary care doctor was on 12/14/21 for his six-month follow-up. His high cholesterol was described as well controlled; his mitral valve prolapse with mild mitral valve regurgitation were described as unchanged.

A Medtronic read-out from the pilot's loop recorder that was retrieved during his autopsy was interrogated by the pilot's cardiologist. At the approximate time of the accident (5/6/22, 07:53 local), there was a 7:43 minutes period of tachycardia with a median heart rate of 300 beats per minute. No electrogram was available for that recording. Two atrial fibrillation recordings of 8-minute duration were reported at 8 and 10 days before the crash with the maximum rate of 130 and 120 beats per minute, respectively; there was a 5-second detection of tachycardia at 194 beats per minute 16 days before the crash. There were multiple post-mortem detections (starting 5/18/22) after the device had been removed from the body. Trends for heart rate variability, average ventricular rate, and patient activities (hours per day) drop off on 5/6/22.

E. SUMMARY OF MEDICAL FACTS

The 67-year-old male pilot was on BasicMed (6/26/21). His third class medical certificate with the authorization for special issuance for history of ablation for atrial fibrillation with a loop recorder implanted in 2019 expired in June 2021. At his most recent FAA medical certification exam on 6/15/20, he reported taking metoprolol for heart rate control and high blood pressure and pravastatin to treat high cholesterol. According to the autopsy report, the pilot's cause of death was drowning, and the manner of death was accident. A recorder device was removed from the pilot's left upper chest. No cardiac anatomic abnormalities or trauma were identified.

Toxicological testing detected ethanol in the pilot's heart blood at 0.116 grams per deciliter (gm/dL), kidney tissue at 0.098 grams per hectogram (gm/hg), spleen tissue at 0.152 gm/hg, and brain tissue at 0.097 gm/hg. N-propanol and n-butanol were detected in his heart blood and kidney, spleen, and brain tissues. Isopropanol was also detected in his heart blood. The tissue specimens were noted to exhibit putrefaction. The non-impairing high blood pressure medication metoprolol was detected in his heart and liver tissues.

According to personal medical records, the pilot had diagnoses of mitral valve prolapse, mitral valve regurgitation, status post ablation of atrial fibrillation, and premature atrial contractions. At the pilot's most recent visit to his cardiologist on 4/18/22, the pilot denied any cardiac symptoms and had a normal physical exam apart from his heart murmur. Interrogation of his loop recorder by his cardiologist showed no episodes of atrial fibrillation and his echocardiogram was reported as stable since 2011 with an ejection fraction of 60-65%. The pilot was taking metoprolol for heart rate and blood pressure management and pravastatin for high cholesterol. His primary care doctor reported at his 12/14/21 office visit that the pilot's cholesterol was well controlled and his mitral valve prolapse and mitral valve regurgitation were unchanged. Recordings from his implanted loop recorder on the morning of 5/6/22 showed a 7:43 minute period of tachycardia with a median heart rate of 300 beats per minute.

Submitted by:

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