

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

April 16, 2024

A. CASE

NTSB ID: CEN23FA113
Location: Little Rock, Arkansas
Date: February 22, 2023

B. MEDICAL SPECIALIST

Specialist Turan Kayagil, MD, FACEP
National Transportation Safety Board
Washington, DC

C. DETAILS

1.0 Description of Review

For purposes of evaluating the pilot for potentially impairing substances and potentially impairing medical conditions, the above Medical Specialist reviewed the following sources of medical information, along with selected relevant regulation, medical literature, and investigator reports.

- Final Federal Aviation Administration (FAA) medical case review
- Autopsy report – pilot
- Toxicology report – pilot

2.0 Summary of Medical Facts

The 64-year-old male pilot's last aviation medical examination was April 20, 2022. At that time, the pilot was 71 inches tall and weighed 192 pounds. He reported no medication use and no active medical conditions. He was issued a first-class

medical certificate limited by a requirement to wear lenses for distant vision and have glasses for near vision.

The Arkansas State Crime Laboratory performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was multiple traumatic injuries and his manner of death was accident. The extent of the pilot's injuries limited autopsy examination for evidence of natural disease. The pilot's brain could not be examined. Examination of the pilot's heart was limited by thermal injury, but identified an area of plaque causing 90% narrowing of the proximal portion of the left anterior descending coronary artery (LAD). The left main coronary artery was free of significant plaque. The proximal portion of the left circumflex coronary artery was 20-30% narrowed. The right coronary artery could not be identified due to thermal injury. The portion of the heart muscle that could be examined did not display visual evidence of scarring from poor blood flow. Microscopic examination was performed of three cross-sections and one longitudinal section from the proximal portion of the LAD. One of the cross sections showed near-complete occlusion by plaque. The others showed 40% and 60% narrowing, respectively. The longitudinal section contained plaque and luminal blood clot; blood clot was also present in one cross-section. The autopsy report stated that the blood clots had likely formed postmortem from heat exposure, since they showed no evidence of organization and the sections showed other evidence of heat-related change. Within the limitations of the autopsy, no other significant natural disease was identified.

Postmortem toxicological testing by the FAA Forensic Sciences Laboratory identified ethanol at 0.018 g/dL in the pilot's cavity blood. Ethanol was not detected in the pilot's liver or spleen tissue. N-propanol and n-butanol also were detected at low levels in cavity blood, and were not detected in liver or spleen tissue. Naproxen was detected in cavity blood and liver tissue.

Ethanol is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.¹ FAA regulation imposes strict limits on flying after consuming ethanol, including a prohibition on piloting a civil aircraft while having a blood ethanol level of 0.04 g/dL or greater.² Alcohol consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can sometimes be produced by microbes in a person's body after death.^{3,4}

¹ Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

² [14 Code of Federal Regulations § 91.17](#).

³ Kugelberg FC, Jones AW. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Sci Int*. 2007;165(1):10-29. doi:10.1016/j.forsciint.2006.05.004.

⁴ Boumba VA, Exadactylou P, Velivasi G, Ziavrou KS, Fragkouli K, Kovatsi L. The frequency of ethanol, higher alcohols and other low molecular weight volatiles in postmortem blood samples from unnatural deaths. *Forensic Sci Int*. 2022;341:111503. doi:10.1016/j.forsciint.2022.111503.

N-propanol and n-butanol are other alcohols that can be produced by microbes in a person's body after death. Detection of n-propanol or n-butanol in a postmortem specimen is potentially indicative of postmortem microbial activity in the specimen, but does not reliably indicate whether microbial activity produced ethanol.^{3,4}

Naproxen is an anti-inflammatory medication that is available over the counter and is commonly used for control of pain and fever. Naproxen is not generally considered impairing.

Submitted by:

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Medical Officer