



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

August 25, 2022

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. CRASH: WPR20FA049; Goodyear; AZ

Date and time: December 21, 2020

Injuries: 1 fatal

B. GROUP IDENTIFICATION

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

C. DETAILS OF INVESTIGATION

1. Purpose

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

2. Methods

The FAA medical case review, autopsy report, toxicology findings, and the investigator's preliminary report were reviewed. Relevant regulation and medical literature were reviewed as appropriate.

FAA Medical Case Review

According to the FAA medical case review, the 62 year old male pilot had reported 375 total flight hours as of his last aviation medical exam, dated 3/11/2016. At that time, he was 69 inches tall and weighed 215 pounds. He had reported cataract surgery in 2011 but no chronic medical conditions and no use of medications. No significant abnormalities were identified and he was issued a third class medical certificate without limitations. At the time of the crash, this certificate had expired. The pilot had completed a comprehensive medical examination certificate for the FAA but had not completed the other requirements for BasicMed so was not medically qualified to fly.

Autopsy

According to the autopsy report issued by the Maricopa County Office of the Medical Examiner, the cause of death was multiple blunt force injuries and the manner of death was accident. The pilot was noted to have an enlarged heart (cardiomegaly) with a total heart weight of 425 gm. In addition, there was a large, 7 cm, area of thinning and fibrosis of the posterolateral left ventricle consistent with a scar from a previous heart attack. In addition, there was severe coronary artery disease with the left anterior descending coronary artery 80-90% stenosed, the right coronary artery about 80% stenosed and containing multiple stents, and the left circumflex artery about 80-90% stenosed. No other significant natural disease was identified.

Toxicology

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified metoprolol, clopidogrel, and atorvastatin in cavity blood and urine. In addition, delta-9-tetrahydrocannabinol (THC, the main psychoactive component in cannabis) was identified in cavity blood at 11.1 ng/ml along with its psychoactive metabolite 11-hydroxy-delta-9-THC (4.5 ng/ml) and its inactive metabolite carboxy-delta-9-THC (32.1 ng/ml). All three were also found in urine at 15.4 ng/ml, 188.1 ng/ml, and 244 ng/ml respectively.

Substance Descriptions

Metoprolol is a prescription medication used to treat high blood pressure and reduce the risk of recurrent heart attacks. It is not generally considered impairing.¹ Clopidogrel, often marketed with the name Plavix, is an antiplatelet drug used to prevent clotting after coronary stenting in order to prevent recurrent heart attacks. It may increase the risk of bleeding but is not considered directly impairing.² Atorvastatin is an anticholesterol drug, often marketed with the name Lipitor, and is not generally considered impairing.³

Delta-9-tetrahydrocannabinol (THC) is the primary psychoactive compound in cannabis (marijuana). THC's mood-altering effects include euphoria and relaxation. In addition, cannabis causes alterations in motor behavior, perception, cognition, memory, learning, endocrine function,

¹ National Institutes of Health. US National Library of Medicine. DailyMed. Metoprolol. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=90aa06a3-100f-4466-b950-506303707b01> Accessed 8/15/2022.

² National Institutes of Health. US National Library of Medicine. DailyMed. Clopidogrel. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=52902cfe-2863-490a-b700-3f47dfe3cf50> Accessed 8/15/2022.

³ National Institutes of Health. US National Library of Medicine. DailyMed. Atorvastatin. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=1daa6f20-a032-4541-939d-931f36a020dd> Accessed 8/15/2022.

food intake, and regulation of body temperature. Specific performance effects include decreased ability to concentrate and maintain attention. Impairment in retention time and tracking, subjective sleepiness, distortion of time and distance, vigilance, and loss of coordination in divided attention tasks have been reported. Significant performance impairments are usually observed for at least 1-2 hours following use, and residual effects have been reported up to 24 hours. The primary metabolite, 11-hydroxy-delta-9-THC, is equally psychoactive, but is rapidly metabolized to the non-psychoactive metabolite carboxy-delta-9-THC). THC concentrations typically peak during the act of smoking, while peak carboxy-delta-9-THC concentrations occur approximately 9-23 minutes after the start of smoking. Concentrations of both compounds decline rapidly and are often less than 5 ng/ml after 3 hours.⁴

D. SUMMARY OF MEDICAL FINDINGS

The 62 year old male pilot had reported cataract surgery in 2011 but no chronic medical conditions and no use of medications to the FAA. At the time of the crash, his last aviation medical certificate had expired. The pilot had completed a comprehensive medical examination certificate but had not completed the other requirements for BasicMed and had not obtained a special issuance regarding his heart disease; he was not medically qualified to fly.

According to the autopsy report issued by the Maricopa County Office of the Medical Examiner, the cause of death was multiple blunt force injuries and the manner of death was accident. The pilot was noted to have an enlarged heart (cardiomegaly) with a total heart weight of 425 gm. In addition, there was a large, 7 cm, area of thinning and fibrosis of the posterolateral left ventricle consistent with a scar from a previous heart attack. In addition, there was severe coronary artery disease with the left anterior descending coronary artery 80-90% stenosed, the right coronary artery about 80% stenosed and containing multiple stents, and the left circumflex artery about 80-90% stenosed. No other significant natural disease was identified.

Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified metoprolol, clopidogrel, and atorvastatin in cavity blood and urine. In addition, delta-9-tetrahydrocannabinol (THC, the main psychoactive component in cannabis) was identified in cavity blood at 11.1 ng/ml along with its psychoactive metabolite 11-hydroxy-delta-9-THC (4.5 ng/ml) and its inactive metabolite carboxy-delta-9-THC (32.1 ng/ml). All three were also found in urine at 15.4 ng/ml, 188.1 ng/ml, and 244 ng/ml respectively.

⁴ National Highway Traffic Safety Administration Drugs and Human Performance Fact Sheets. Marijuana. <https://rosap.nhtl.bts.gov/view/dot/2003>