CLINICAL VIGNETTE

NSVT in an Airline Pilot

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Clinical Presentation

A sixty-year-old male was referred to cardiology from primary care due to premature ventricular contractions (PVCs) noted on routine electrocardiogram (ECG).

The patient reported being in good health. He used to be an avid marathon runner and remained active daily. He was initially diagnosed with PVCs during his military service as a fighter jet pilot. Due to the PVCs, he was required by the Federal Aviation Association (FAA) to have an annual physical exam and cardiovascular assessment. Prior evaluations included ECG, holter monitor, echocardiogram, and thallium single-photon emission computed tomography every three years which had all been within normal limits. Because the studies were consistently normal, he was given a military waiver to fly without continued cardiac evaluation. After he left the military and became a commercial pilot he resumed annual ECGs and exercise stress tests. The patient reported he presently only flies in dual-pilot aircrafts.

On physical exam, he appeared in no acute distress. Auscultation revealed regular heart rate without murmurs. The remainder of his exam was benign. He specifically denied any cardiac complaints, including chest pain or palpitations.

Cardiodiagnostics

A cardiac workup was performed. Transthoracic echocardiogram revealed a normal ejection fraction and no valvulopathy. He underwent a stress test and exercised for eleven minutes and twenty-nine seconds to stage four on the Bruce protocol, achieving 13.4 METs. The stress test noted frequent PVCs with rest which did not improve with stress. At peak exercise, the patient had frequent PVCs with periods of bigeminy.

A two-week holter monitor revealed normal sinus rhythm for the majority of the time. He had rare PVCs with a burden of less than one percent. He had an episode of ventricular trigeminy that lasted for 6.1 seconds as well as three episodes of non-sustained ventricular tachycardia, with the longest episode lasting 14.7 seconds. None of these episodes were symptomatic.

Clinical Decision-making

Considering the findings on the stress test, holter monitor, and the patient's high-risk occupation, a cardiac MRI was ordered to assess for structural abnormalities, which did not show any evidence of scar. Electrophysiology was consulted, and after reviewing the studies, the electrophysiologist determined that no additional studies were needed. The patient was initiated on beta-blocker therapy to suppress the NSVT and PVCs.

Discussion

The FAA has established a set of guidelines for assessment of aircrew personnel's medical fitness to operate an aircraft. As part of this evaluation, the association requires an annual ECG for all aircrew after the age of forty.[1]

The decision to allow aircrew to fly is based on the recommendation of a FAA-designated Aviation Medical Examiner (AME) regarding medical fitness for flight. Aircrew personnel with two or more PVCs, can be issued flight certification if there is no evidence of structural or functional heart disease and the PVCs resolve with exercise."[1]

For most patients with infrequent PVCs and NSVT, cardiac MRI and electrophysiology consultation is not needed. In this patient, the decision to pursue additional testing was due to his occupation and lack of clear consensus regarding safety of flight.

When there is no resolution of the PVCs with exercise, the decision to permit pilots to continue flying is more nuanced. In this patient, low PVC burden, lack of structural heart disease, lack of symptoms, and dual-pilot flights supported the decision to maintain his pilot license with continued medical therapy and periodic reassessment.

Conclusion

PVCs are common findings that are often caught incidentally on ECG. Management for patients with PVCs depends on both symptoms and PVC burden. Typically, cardiac MRI and electrophysiology consultation are not needed. Additional testing and consultation may be considered in patients with high-risk occupations. The FAA provides guidelines for recommended cardiac workup in aircrews. The decision to allow crewmembers with cardiac conditions to continue flying should be an interdisciplinary decision.

REFERENCES

1. Federal Aviation Administration. Guide for Aviation Medical Examiners. Available at: https://www.faa.gov/ame_guide. Accessed May 29, 2024.