Cardiac Transplant  
Case Report, by N.V.T. Tran, MD, MPH

Cardiac disease is the leading cause of mortality in the United States. Every minute, one American dies due to cardiac disease (1,2). Technological advances in cardiac transplants have saved many lives. As of December 2013, more than 56,000 cardiac transplants have been performed in the U.S. since 1988 (3). An airman with a cardiac disease obviously raises safety concerns. The Federal Aviation Administration strives to support airmen in their pursuit for flying, while keeping the airspace safe. This is sometimes a delicate balance, especially if the disease process is very complex. To fly after a cardiac transplant is such an example in which we have to carefully explore the boundaries between risk acceptance and safety.

History

A 69-year-old airman with 900 flying hours applied for a third-class medical recertification in April 2010 after an orthotopic heart transplant in November 2006. His medical history consisted of non-Hodgkin’s lymphoma (1996), which was treated with doxorubicin hydrochloride (Adriamycin) and stem cell transplant. Subsequently, he suffered from a drug-induced cardiomyopathy, which led to his cardiac transplantation. He was treated for depression after his surgery; the treatment was discontinued in 2010. Additionally, he underwent radiation therapy in 2008 for prostate cancer (adenocarcinoma) that was confined within the prostate capsule. No recurrence of the malignancies has been noted upon regular medical evaluations.

His surgery and recovery after the heart transplant was uneventful. Multiple biopsies of the allograft over the years showed no signs of rejection. The coronary angiography of his new heart in April 2010 showed no abnormalities. Additionally, a Holter monitor was performed in May 2010, and no malignant arrhythmias or pauses were present. His stress echocardiography on dobutamine over a period of 8.31 minutes recorded an ejection fraction of 55%, with 98% of the maximum predicted heart rate; maximum blood pressure 186/92; and no ST changes or arrhythmias were seen. His current medications: cyclosporine, sirolimus, aspirin, simvastatin, and olmesartan.

Aeromedical Issues

Separately, each medical issue in this airman’s history might be disqualifying. His malignancies showed no recurrence, and his psychiatric and psychological evaluation was normal. Let us focus on the more challenging medical condition, namely his cardiac transplant. As you can imagine, this raises many aeromedical concerns. Until the present day, only eight airmen with cardiac transplants have been issued a third-class medical certificate. The major concern is the sudden incapacitation due to coronary allograft vasculopathy, rejection of the allograft, malfunction of the pacemaker, infections due to the immunosuppressive state, adequate cardiovascular response to high stress, high performance demands, etc.
the FAA Guide for Aviation Medical Examiners (7) under the cardiac transplant disease protocol:

- A 1 year recovery period shall elapse after the cardiac transplant before consideration
- A current report from the treating transplant cardiologist regarding the status of the cardiac transplant, including all pre- and post-operative reports. A statement regarding functional capacity, modifiable cardiovascular risk factors, and prognosis for incapacitation
- Current blood chemistries (fasting blood sugar, hemoglobin A1C concentration, and blood lipid profile to include total cholesterol, HDL, LDL, and triglycerides)
- Any tests performed or deemed necessary by all treating physicians (e.g., myocardial biopsy)
- Coronary angiogram
- Graded exercise stress test and stress echocardiogram
- A current 24-hour Holter monitor evaluation to include selective representative tracings
- Complete documentation of all rejection history, whether treated or not; include hospital records and reports of any tests done
- A complete history regarding any infectious process
- All complete history regarding any malignancy
- List of all present medications and dosages, including side effects

**Outcome**

Our airman met the stringent requirements listed above. He requested a third-class medical 4 years after his cardiac transplant. His cardiac examination showed no signs of rejection, and cardiac functioning was normal. A concern can be raised for his non-skin malignancy (prostate cancer) two years after his surgery, although no recurrence has been found on subsequent medical evaluations. With a favorable advice by the FAA cardiology consultant and normal medical results, the FAA has granted a Special Issuance with a 12-month time limitation.

**References**


**About the Author**

N.V.T. Tran, MD, MPH, was a U.S. Air Force School of Aerospace Medicine Resident in Aerospace Medicine, Class of 2012. He is an Exchange Officer from the Royal Netherlands Air Force. He wrote this article during a rotation at the FAA Civil Aerospace Medical Institute in Oklahoma City, OK.