Association of New Left Anterior Fascicular Block with Structural Heart Disease in U.S. Air Force Military Aircrew

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I have no financial relationships to disclose.

I will not discuss off-label use and/or investigational use in my presentation.
Introduction

• Left anterior fascicular block (LAFB) may be a marker of underlying structural heart disease
  • Coronary artery disease – LAD coronary artery
  • Arterial hypertension
  • Aortic heart disease
  • Certain cardiomyopathies

• Varies in prevalence from 0.9% to 6.2% in the general population\(^1\) and 0.01% to 0.9% in the military aviator\(^2,3\)
Introduction

• Military aircrew are healthier than the general population

• Current USAF policy requires further evaluation in aircrew with LAFB<sup>4</sup>
  • Age > 35 years
    • Exercise treadmill testing and echocardiogram
  • Age ≤ 35 years
    • Echocardiogram
Introduction

• 1.2 million ECGs in the USAF School of Aerospace Medicine (USAFSAM) ECG Library dating back to 1950
  • 281,737 unique aviators (current as April 2013)

• Expand upon research by Yoosefian, Lopez, and Kruyer\textsuperscript{5}

• Review LAFB evaluation results to assess the usefulness of the current USAF policy
Methods

- **LAFB**
  - Displacement of the mean QRS axis in the frontal plane to between \(-45^\circ\) and \(-90^\circ\), and
  - A qR complex in leads I and AVL, an rS complex in leads II, III and AVF, and
  - Normal or only slightly prolonged QRS duration
Methods

- Reviewed the records of 702 unique military aircrew with new LAFB contained in the USAFSAM ECG Library with demographics (BP, Age, Ht, Wt)

- Testing data available limited to diagnostics performed at USAFSAM only
Methods

• **Echocardiogram classification**
  - Normal
  - Normal Variant
  - Abnormal

• **Exercise treadmill testing classification**
  - Normal
  - Borderline
  - Abnormal
Results

• Demographics (561 unique aircrew)
  • Average Age: 36 yr (19 to 63 yr)
  • Average Height: 71" (62 to 79")
  • Average Weight: 180 lb (114 to 260 lb)
    • BMI 25.1

• Demographics (359 unique aircrew)
  • Average BP: 121/77 mmHg
    • Systolic 96 to 172 mmHg
    • Diastolic 60 to 116 mmHg
Results

• 41 underwent echocardiography
  • 7 (17%) were interpreted as Normal
  • 23 (56%) were interpreted as Normal Variant
  • 11 (27%) were interpreted as Abnormal

• 56 underwent exercise treadmill testing
  • 52 (93%) were interpreted as Normal
  • 1 (2%) were interpreted as Borderline
  • 3 (5%) were interpreted as Abnormal
Results

11 (27%) with Abnormal Echocardiography

• 2 - Bicuspid AV
• 2 - Mild LAE
• 2 – Septal motion abnormalities
• 1 – Mild RV hypertrophy

• 1 - Mild AI
• 1 – AV thickening
• 1 – MVP
• 1 – Mild PI
Results

3 (5%) with Abnormal Exercise Treadmill Testing

• 1 with ST Segment Depression
• 1 with LBBB/AV Block
• 1 with PVCs and Ventricular Tachycardia
Results

• **Transient LAFB**
  - 31 aviators - NSR → LAFB
  - 9 aviators - NSR → LAFB → NSR
  - 4 aviators - NSR → LAFB → NSR → LAFB
  - 4 aviators - LAFB → NSR
  - 4 aviators - LAFB → NSR → LAFB

• **LAFB Prevalence = 0.249% (702/281737)**
Conclusion

• Inconclusive if isolated LAFB in USAF aircrew appears to be predictive of underlying heart disease

• Stress testing is likely warranted over age 35 in the setting of LAFB

• Echocardiography is likely warranted in the setting of LAFB

• ECG Library has limitations, particularly if studies performed locally

• Further investigation required
References


