Wolff-Parkinson-White Progression and Aeromedical Risk

DAVID C MILLER, DO, MPH
MAJ, USAF, MC, FS

USAF School of Aerospace Medicine
WPAFB, OH
RAM 2013
I have no financial relationships to disclose.

I will not discuss off-label use or investigational use in my presentation.
## Published Data

<table>
<thead>
<tr>
<th>Population</th>
<th>Prevalence</th>
<th>Rate</th>
<th>SVT</th>
<th>SCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Krahn et al. YHM* Canadian</td>
<td>10/3,983</td>
<td>0.25%</td>
<td>5/19</td>
<td>0/19</td>
</tr>
<tr>
<td>Kobza et al. YHM* Swiss conscripts</td>
<td>53/41,699</td>
<td>0.13%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith U.S. Naval aviation training</td>
<td>33/34,756</td>
<td>0.095%</td>
<td>0/33</td>
<td>0/33</td>
</tr>
<tr>
<td>Munger et al. Mayo population study</td>
<td>113/</td>
<td>0.075%</td>
<td>45/113</td>
<td>2/113</td>
</tr>
<tr>
<td>Chiu et al. Taipei school children</td>
<td>290/43,2166</td>
<td>0.067%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitzsimmons et al. USAF aviators</td>
<td>238/</td>
<td></td>
<td>47/228</td>
<td>1/228</td>
</tr>
</tbody>
</table>

*YHM = Young Healthy Male
Current Study

• **Design**
  • Retrospective case series

• **Methods**
  • USAF ECG library
  • Identify those coded as WPW
  • Identify WPW with normal ECGs, SVT, SCD
## Demographics

<table>
<thead>
<tr>
<th></th>
<th>First Visit</th>
<th>Last Visit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>29.4</td>
<td>19-56</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td>M (97.5%)</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td>24.3</td>
<td>16.7-35.1</td>
</tr>
<tr>
<td><strong>Systolic BP</strong></td>
<td>119</td>
<td>86-148</td>
</tr>
<tr>
<td><strong>Diastolic BP</strong></td>
<td>74</td>
<td>54-92</td>
</tr>
</tbody>
</table>

*Age and BMI were available for 629/729, Gender for 122/729, First BPs for 176/729, Last BPs for 183/729*
## Published Data

<table>
<thead>
<tr>
<th>Population</th>
<th>Prevalence</th>
<th>Rate</th>
<th>SVT</th>
<th>SCD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miller et al. USAF Aviators</td>
<td>729/281,737</td>
<td>0.259%</td>
<td>1/729</td>
<td>0/729</td>
</tr>
<tr>
<td>Krahn et al. YHM* Canadian</td>
<td>10/3,983</td>
<td>0.25%</td>
<td>5/19</td>
<td>0/19</td>
</tr>
<tr>
<td>Kobza et al. YHM* Swiss conscripts</td>
<td>53/41,699</td>
<td>0.13%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smith U.S. Naval aviation training</td>
<td>33/34,756</td>
<td>0.095%</td>
<td>0/33</td>
<td>0/33</td>
</tr>
<tr>
<td>Munger et al. Mayo population study</td>
<td>113/</td>
<td>0.075%</td>
<td>45/113</td>
<td>2/113</td>
</tr>
<tr>
<td>Chiu et al. Taipei school children</td>
<td>290/43,2166</td>
<td>0.067%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fitzsimmons et al. USAF aviators</td>
<td>238/</td>
<td></td>
<td>47/228</td>
<td>1/228</td>
</tr>
</tbody>
</table>

*YHM = Young Healthy Male
Incidence

- Cases with history of normal ECG
  - 46/729 – 23 of 46 returned to normal ECG
  - Incidence: 46/281,737 = 9.3/1,000 per year

- WPW pattern with follow-up normal ECG
  - 17/729

- Intermittent nature of WPW
Results

• Higher prevalence than other large studies

• Lower rate of SVT and SCD
Discussion

• Survivor & selection bias

• If asymptomatic, low rate of progression
  • 0.7% per year

• If symptomatic, higher rate of progression
  • 2% per year

• Current study not linked to clinical data
New USAF Policy

- WPW pattern or syndrome is disqualifying
- FCI candidates require EP study
  - Ablate if high risk only
    - Retrograde conduction
    - Multiple pathways
    - Short refractory period
    - Symptomatic
- All others require Holter and treadmill testing


Acknowledgments

- Rosa L Alvarado – research assistant
- Dr. Eddie Davenport – cardiology supervision
- Jared T. Haynes – statistician
Questions
Current Data

- **Krahn et al. (young healthy male Canadian)**
  - 19/3,983, prevalence of 0.25% - 5/19 with PSVT, 0/19 SCD

- **Kobza et al. (Young healthy male Swiss conscripts)**
  - 53/41,699, prevalence of 0.13%

- **Smith (US Naval aviation training)**
  - 33/34,756, prevalence of 0.095% - 0/33 with PSVT, 0 with SCD

- **Munger et al. (Mayo population study)**
  - 113/?, prevalence of 0.075% - 45/113 Dysrhythmia, 26/113 PSVT, 2/113 SCD

- **Chiu et al. (Taipei school children)**
  - 290/432,166, prevalence of 0.067%

- **Fitzsimmons et al. (USAF aviators)**
  - 238/?, prevalence of ? – 47/228 SVT, 1/228 with SCD