Correlation of VACS Index Vs. Restricted Index with Functional Performance and Sarcopenia

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OBJECTIVE:
To characterize functional performance of HIV-infected adults on stable ARV therapy.

Functional Performance
- 6-MW Test
- Grip Strength
- Isokinetic Leg Strength
- Treadmill Test

Body Composition
- DXA
- CT scan mid-thigh
- Anthropometrics
Cross-sectional Study of HIV-infected Veterans at the Baltimore VA

Inclusion Criteria
- Sedentary
- Community-dwelling
- No AIDS conditions 6+ months
- HAART 6+ months

Exclusion Criteria
- Poorly controlled HTN (SBP/DBP>180/105)
- CHF (class III or IV)
- Anemia (hgb< 10gm/dl)
- End stage liver or kidney disease

Post-hoc Analysis of 56/70 participants with:
1) Informed consent for VACS
2) All available data for VACS index within 1 year testing
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>N= 56 n (%)</th>
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<tbody>
<tr>
<td><strong>Age, years</strong></td>
<td></td>
</tr>
<tr>
<td>30-49</td>
<td>21 (38%)</td>
</tr>
<tr>
<td>50-59</td>
<td>26 (46%)</td>
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<tr>
<td>60+</td>
<td>9 (16%)</td>
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<tr>
<td><strong>CD4 Cell Count, mm³</strong></td>
<td></td>
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<tr>
<td>0-200</td>
<td>12 (21%)</td>
</tr>
<tr>
<td>201-349</td>
<td>16 (29%)</td>
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<tr>
<td>350+</td>
<td>28 (50)</td>
</tr>
<tr>
<td><strong>HIV-1 viral load &lt;400 copies/ml</strong></td>
<td>49 (88%)</td>
</tr>
<tr>
<td><strong>Hepatitis C seropositive</strong></td>
<td>46 (82%)</td>
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<tr>
<td><strong>Hemoglobin &lt; 10g/dL</strong></td>
<td>1 (2%)</td>
</tr>
<tr>
<td><strong>eGFR &lt;60 ml/min</strong></td>
<td>6 (11%)</td>
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<tr>
<td><strong>BMI &lt; 18.5 kg/m²</strong></td>
<td>3 (5%)</td>
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</tbody>
</table>

**VACS Index**
- Mean (SD) = 34 (16)
- Median = 31
- Range = 0-75
Grip Strength and Restricted vs. VACS Index

\( \rho = -0.14 \quad p = 0.3 \)

\( \rho = -31 \quad p = 0.02 \)
Leg Strength and Restricted vs. VACS Index

rho = -0.16
p = 0.3

rho = -41
p < 0.01
Ambulatory Function (6-MW) and Restricted vs. VACS Index

\[ \rho = -0.16 \]
\[ p = 0.2 \]

\[ \rho = -0.26 \]
\[ p = 0.05 \]
Hypothesis:

The current VACS Index is a measure of multiorgan injury which is associated with functional performance via peripheral factors.
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Total Lean Mass (DXA) and Restricted vs. VACS Index

- Restricted Score
  - rho = 0.25
  - p = 0.07

- VACS Index Score
  - rho = -0.55
  - p < 0.001
Leg Strength Correlates with Total Lean Mass

\[ \rho = -0.30 \]
\[ p = 0.04 \]
Hypothesis:

Cardiac function is associated with functional performance measures of endurance
Preliminary Results from CVD VACS: 6-MW Correlates with Diastolic Function

![Graph showing correlation between 6-Minute Walk Distance (6-MWD) and Left Atrial Pressure (E/E')]

- Correlation coefficient: $r = -0.46$
- Statistical significance: $p < 0.01$
Conclusions & Future Directions

1) Compared to Restricted Index, VACS index was more correlated with strength and with sarcopenia.

2) 20 point higher VACS Index score was associated with 10% lower leg strength.

Can the VACS index be used to identify risk for impaired function due to muscle weakness and wasting?

Does CVD affect endurance….and should it be added to the VACS Index?
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HIV

CVD

Endurance

Muscle Weakness

Muscle Wasting

Physical Function

Physical Activity

Energy Expenditure

Obesity

Insulin Resistance

Disease

Disability

Poor QOL

Oursler, 2011; Adapted from KS Nair, Aging Muscle, Am J Clin Nutr 2005