Distribution Of Microvascular Endothelial Function vs. Blood Pressure In Different Clinical And Non-clinical Settings In The United States And China

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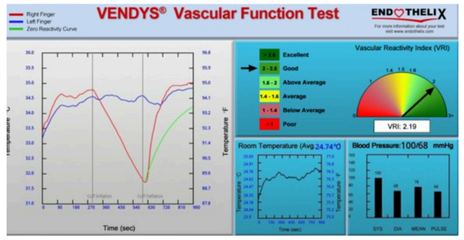
Background:

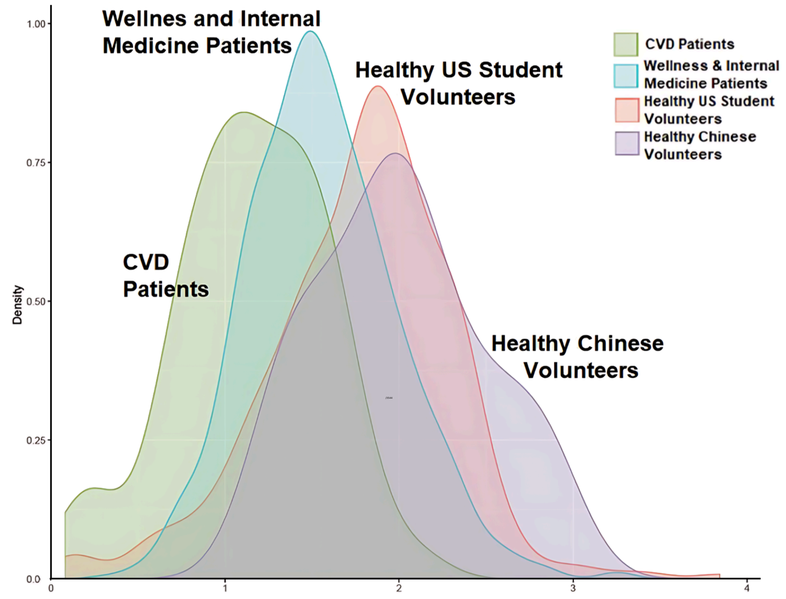
Despite the fact that microvascular (endothelial) dysfunction is associated with various diseases from cardiovascular to kidney, lung, liver, and other medical conditions, it has not been extensively studied in various clinical and non-clinical settings as blood pressure has. Digital Thermal Monitoring (DTM) of microvascular endothelial function is a new and automated technique based on monitoring fingertip temperature fall and rebound during reactive hyperemia. Here we report distributions of microvascular function versus blood pressure across (1) CVD patients, (2) wellness and internal medicine clinics, (3) college students, and (4) community-based healthy volunteers in China.

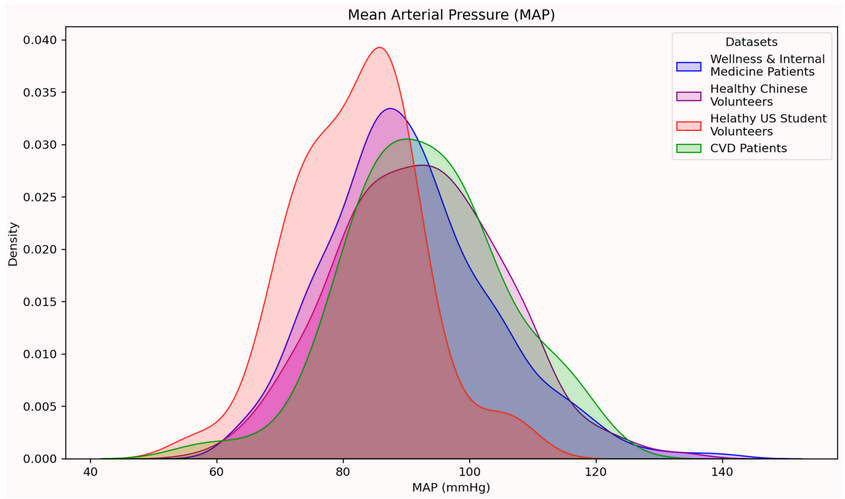
Methods:

A total of 7,907 endothelial function test results were collected from various settings. Blood pressure and heart rate were measured before the tests. The tests were conducted using FDA-approved automated VENDYS devices (Endothelix Inc., Palo Alto, CA). Adjusted maximum temperature rebound was reported as Vascular Reactivity Index (VRI) and compared across different settings. Mean Arterial Pressure (MAP) is equal to 1/3 systolic pressure plus 2/3 diastolic pressure.



Density Plots By VRI In Different Risk Groups





Results:

VRI and MAP in CVD clinic patients (VRI: 1.25±0.34, MAP: 93.0±12.2), wellness and internal medicine clinics (VRI: 1.53±0.5, MAP: 90.5±13.1), college students (VRI: 1.86±0.5, MAP: 82.2±9.8), and Chinese volunteers were (VRI: 1.95±0.44, MAP: 92.2±13.0) respectively P<0.01. Age was weakly correlated with VRI with the equation age=-0.01 VRI+2.01 (r=0.17 p<0.001)

Conclusions:

To our knowledge, this is the largest database of finger-based endothelial function testing. VRI showed distinct distributions across various clinical and non-clinical settings with CVD patients exhibiting the lowest and Chinese healthy volunteers the highest values. The VRI trend mimics the statistically expected risk trend with CVD patients having the highest and Chinese healthy volunteers having the lowest CVD events risk.