Resting Blood Flow in the Skin: Does It Exist, and What Is the Influence of Temperature, Aging, and Diabetes?

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Abstract

Measurement of resting blood flow to the skin and other organs is an important indicator of health and disease and a way to assess the reaction to various stimuli and pharmaceutical interventions. However, unlike plasma ions such as sodium or potassium, it is difficult to determine what the proper value for resting blood flow really is. Part of the problem is in the measurement of blood flow; various techniques yield very different measures of skin blood flow even in the same area. Even if there were common techniques, resting blood flow to tissue, such as the skin, is determined by the interaction of a plurality of factors, including the sympathetic nervous system, temperature, pressure, shear forces on blood vessels, tissue osmolality, and a variety of other stimuli. Compounding this variability, the blood flow response to any stressor is reduced by free radicals in the blood and diminished by aging and diabetes. Race also has an effect on resting blood flow to the skin. All these factors interact to make the exact resting blood flow difficult to determine in any one individual and at any one time. This review examines the main techniques to assess blood flow, the factors that alter blood flow in the skin, and how aging and diabetes affect blood flow. Recommendations for the measurement of resting blood flow are presented.

J Diabetes Sci Technol 2012;6(3):674-685

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Abbreviation: (FMD) flow-mediated vasodilation

Keywords: aging, circulation, diabetes, free radicals

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