Aerobic Exercise and Circulatory Dysfunction in Resistant Hypertension

To the Editor:

We read with great interest the article by Dimeo et al dealing with the effects of aerobic exercise on blood pressure, arterial compliance, and cardiac index in resistant hypertensive subjects. The results of their study demonstrated that exercise significantly decreased systolic and diastolic daytime ambulatory blood pressure in patients with resistant hypertension. In addition, regular exercise reduced blood pressures on exertion and increased physical performances as assessed by maximal oxygen uptake and lactate curves, although arterial compliance and cardiac index remained unchanged. The authors proposed that physical exercise might decrease blood pressure even in subjects with low responsiveness to medical treatment, and the effect might be independent of the improvement of vascular stiffness.

In a study presented previously, we demonstrated that aerobic physical exercise significantly ameliorated the membrane fluidity (a reciprocal value of membrane microviscosity) of erythrocytes in essential hypertensive subjects, suggesting that exercise could have a beneficial effect on the erythrocyte membrane rigidity and restore microcirculatory dysfunction in hypertension. Recent evidence indicates that aerobic physical exercise may increase the production of nitric oxide (NO) and reduce endothelial dysfunction. It was shown that NO significantly increased the membrane fluidity of erythrocytes and improved the rigidity of cell membranes in subjects with essential hypertension. In addition, we demonstrated that the lower membrane fluidity of erythrocytes was associated with decreased levels of plasma NO metabolites and increased levels of asymmetric dimethylarginine (an endogenous inhibitor of NO synthase). One hypothesis is that NO would be a defense against rheological abnormalities and circulatory disorders in hypertensive subjects. Although the authors mentioned that exercise did not have any significant effect on the large arterial compliance, we would like to know whether exercise might influence the blood rheological behavior or endothelium-dependent blood flow in resistant hypertension in the study of Dimeo et al. It would be necessary to assess more precisely the functional interaction between exercise and microcirculation and its contribution to the therapeutic approach to resistant hypertension.

Disclosures

None.

Kazushi Tsuda
Cardiovascular and Metabolic Research Center
Kansai University of Health Sciences
Osaka, Japan

Aerobic Exercise and Circulatory Dysfunction in Resistant Hypertension
Kazushi Tsuda

Hypertension. 2012;60:e45; originally published online October 15, 2012;
doi: 10.1161/HYPERTENSIONAHA.111.00030

Hypertension is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231
Copyright © 2012 American Heart Association, Inc. All rights reserved.
Print ISSN: 0194-911X. Online ISSN: 1524-4563

The online version of this article, along with updated information and services, is located on the
World Wide Web at:
http://hyper.ahajournals.org/content/60/6/e45

Permissions: Requests for permissions to reproduce figures, tables, or portions of articles originally published
in Hypertension can be obtained via RightsLink, a service of the Copyright Clearance Center, not the Editorial
Office. Once the online version of the published article for which permission is being requested is located,
click Request Permissions in the middle column of the Web page under Services. Further information about
this process is available in the Permissions and Rights Question and Answer document.

Reprints: Information about reprints can be found online at:
http://www.lww.com/reprints

Subscriptions: Information about subscribing to Hypertension is online at:
http://hyper.ahajournals.org//subscriptions/