

Issue 106

In a nutshell

Endothelial function (including arterial dilation) is an important parameter in the development of cardiac disease. Various nutrients, (such as antioxidant vitamins, coenzyme Q, folate and red wine) can beneficially affect it.

Clinical trials of interventions to improve endothelial function are still at an early stage, but show promise.

Nutrition and endothelial function

Arbor Clinical Nutrition Updates 2001 (Oct);106:1-2
ISSN 1446-5450

ARCHIVES

The full list of archived issues can be found at www.arborcom.com/archives/
Some issues of our translated language editions are also available in archive, for Spanish, Portuguese and French.

COPYRIGHT, disclaimer and terms of use

This copy from our archives is for your private use only, and is NOT to be forwarded to any other party. Your use of these Updates constitutes your agreement to our disclaimer and terms of use: see section at the end of this publication.

NUTRITION RESEARCH REVIEW

Study one: Tea corrects endothelial dysfunction

Both short- and medium-term consumption of tea improves abnormal endothelial function, according to the results of a recently published American study. The effect was not due to the caffeine in the tea.

Subjects: 66 patients with proven coronary artery disease

Method: Randomised, controlled cross-over intervention study. Subjects drank either black tea (450 ml) or water on a single occasion and had brachial artery vasomotor function assessed using ultrasound. The subjects then consumed either tea or water for 4 weeks.

Results: Tea consumption was associated with improved flow-mediated dilation (FMD) of the brachial artery. FMD is a measure of endothelium-dependent endothelial function. Water had no effect.

The benefits on endothelial function were seen in both the immediate and the 4 week time periods ($p < 0.001$ by repeated-measures ANOVA). An equivalent oral dose of caffeine had no short-term effect on FMD.

Reference: Duffy SJ et al. Short- and long-term black tea consumption reverses endothelial dysfunction in patients with coronary artery disease. *Circulation*. 2001;104:151-6

Study two: Vitamin C and angina

Vitamin C given intravenously improves endothelial function in angina patients, according to a study from Japan.

Subjects: 28 patients with variant angina and 24 controls.

Method: Flow mediated dilation of the brachial artery was measured in both groups. 17 of the angina subjects were randomised to receive intravenous vitamin C or placebo.

Results: FMD was significantly less in the angina patients than in the controls (1.8% vs 6.4%, $p < 0.001$). Administration of intravenous vitamin C significantly improved FMD (from 2.2% to 4.5% $p < 0.01$), whereas placebo had no significant effect.

Reference: Hamabe A et al. Impaired endothelium-dependent vasodilation in the brachial artery in variant angina pectoris and the effect of intravenous administration of vitamin C. *Am J Cardiol* 2001;87:1154-9

Study three: Vitamin E and diabetics

High dose vitamin E supplementation improves endothelial function in patients with type I diabetes mellitus, according to Australian research.

Subjects: 41 subjects with type I diabetes.

Method: Randomised placebo-controlled intervention trial in which active treatment was oral vitamin E supplementation (1,000 IU for three months).

Results: Subjects on vitamin E supplementation had

significant improvement in FMD (from 2.6% to 7.0%, $p < 0.005$). Placebo treatment produced no significant change.

The improvement in endothelial function associated with vitamin E supplementation was correlated with the changes in LDL vitamin E concentration ($r = 0.42$, $p < 0.05$) and with changes in the oxidative susceptibility of LDL ($r = 0.64$, $p < 0.0001$).

Reference: Skyrme-Jones RA et al. Vitamin E supplementation improves endothelial function in type I diabetes mellitus: a randomized, placebo-controlled study. *J Am Coll Cardiol* 2000 Jul;36(1):94-102

Comments

In the last issue #105 we discussed a study on the relationship between homocysteine and arterial endothelial function. We pointed out that deterioration in endothelial function is one of the mechanisms which is thought to be involved in the development of ischaemic cardiovascular disease.

The endothelial cells lie between the blood and the vascular wall, and are involved in regulating the tone of the arterial muscle.

These three studies are just a few of many that have been published over the last two years on the impact of nutritional intervention on endothelial function. The subject is currently of great interest. Other nutrients that have been involved in recently published intervention trials on endothelial function include: coenzyme Q, folate and red wine.

Clinical situations in which such trials have been conducted include patient groups with: diabetes (types I and II), coronary artery disease, hypertension, hypercholesterolaemia, renal transplantation, smokers and healthy subjects.

Not all results have been as positive as the three trials summarised above. In some cases no benefit or only short term benefit was found.

But on balance the results from the trials published over the last two years have been promising, even though they have so far only involved small numbers of subjects and short term interventions.

If we continue to see a trend of positive results from such trials, it will be a significant step in the story of nutrition and ischaemic heart disease.

Firstly, it will almost certainly help us to better understand the mechanisms which lie behind the epidemiological associations between diet and heart disease. For example, the apparent protective effects of red wine and tea, the role of various types of fat etc.

Secondly, it may enable us to identify in advance which patients are likely to respond to certain kinds of nutritional interventions.

We know only too well how inconsistent have been the results of the various prospective trials of supplements (such as vitamins E and C) in protecting against heart disease. One possible explanation is that this is due in part to differences in the type and severity of endothelial dysfunction that is found in such patients.

If this turns out to be true, it may then be feasible to identify those patients who are most likely to respond to such nutritional treatments by conducting short term 'intervention trials' on them using these nutrients, and monitoring the response of endothelial function.

This is currently just a hypothesis. But it is an intriguing one, and much work is now underway to see if further progress can be made.

Disclaimer, copyright and terms of use

Your use of these Updates constitutes your agreement to our disclaimer and terms of use which can be found on our web site at: <http://arborcom.com/disclaim3.htm>. You can also obtain the disclaimer and terms of use by emailing us at: upD@arborcom.com.

© Copyright Arbor Communications PTL 2001. All rights reserved. This publication may NOT be forwarded onto others without our written permission.

If you want to receive the Clinical Nutrition Updates on an ongoing basis, please send us a request email to upD@arborcom.com. This is a FREE service to health professionals and students. Include details of your name, email address, which country you live in, institution you are associated with (if relevant) and professional background. The Updates are available in English, Spanish, Portuguese, Italian, French, Korean and Russian