Improvement of Arterial Stiffness by a Natural Antioxidant Preparation

P.A. Öckerman, MD, PhD[1]

1. Professor emeritus in Clinical Biochemistry, University of Lund. Suddeviksvägen 12, S-475 37 Bohus-Björkö, Sweden. Email: pa.oeckerman@telia.com

Abstract *Single, oligo- and multi-nutrient preparations, food extracts, nutritional and life-style interventions have been found to diminish risk factors for cardiovascular disease (CVD).*
Objectives: To determine if a preparation of natural antioxidants (Andox) mitigates CVD risk factors in individuals with pathological values for pulse wave velocity (PWV).
Design: Case series involving 30 patients, age 45-87 years, mean age 67.6 years, involving 19 females and 11 males.
Setting: Private medical practice (Bohus-Björkö, Sweden).
Intervention: ANDOX tablet with a unique mixture of extracts of blueberry, grape seed, green tea, arctic raspberry, pollen and SOD (Mirorcle Pte Ltd, Singapore) was taken orally during four months.
Main outcome measures: Arterial stiffness in the aorta, endothelial function of small arteries and arterial and central blood pressure was assayed monthly by the Arteriograph during four months of treatment. Values were compared to age-matched values in the Swedish population and biological age was calculated. Assays were also made of brachial blood pressure, advanced glycation end products and oxidative stress.
Results: Statistically significant improvement was seen for several different CVD risk factors: Brachial systolic and diastolic blood pressure, central systolic blood pressure, aortic stiffness as measured by pulse wave velocity (PWV), endothelial function in small arteries and arterioles as measured by augmentation index (AIX), oxidative stress and advanced glycation end products. The biological age for PWV decreased by 37 years and for AIX by 31 years, which means that the risk for a CVD-event went from much higher to the same as in the reference population. Also oxidative stress was highly significantly decreased as measured by erythrocyte fragility. There was also a tendency to a decrease of advanced glycation end products.
Conclusion: Certain documented risk factors such as aortic stiffness and endothelial function of small arteries for CVD events like stroke and myocardial infarction are not normally measured in the clinical routine or known by the patient ("hidden risk factors"). It is well known that in about 50% of all first such CVD events no risk factors were known. This study indicates that ANDOX tablet with a unique mixture of natural antioxidant-rich extracts of blueberry, grape seed, green tea, arctic raspberry, pollen and SOD (Mirorcle Pte Ltd, Singapore) may diminish such risk factors significantly, thereby probably influence CVD morbidity and mortality. It is stressed that studies with antioxidants always must be performed with a broad spectrum of components, since single nutrients most often are ineffective.

Background

It is generally accepted that certain factors such as diet, smoking, gross overweight, high blood pressure, diabetes, rheumatoid arthritis, sedentary life-style may influence the risk of experiencing a CVD event. In morbidity statistics it is considered that in about 50% of all first events in an individual with myocardial infarction no risk factor was known. Therefore, it has been considered probable that other, so

called hidden risk factors exist. In large studies some such hidden risk factors have been identified by measuring arterial stiffness, endothelial function and central blood pressure by the Arteriograph.[1,2] Unfortunately, this technique is not yet generally used in medical service, probably because no active pharmacological treatment has been documented. In an earlier study,[3] using a complex mixture of nutrients, it was suggested that future research should be performed to find among other goals simpler nutritional supplement treatment protocols and a possible such protocol is now presented.

Methods

Patient selection

Inclusion criteria: A value for the biological age for Pulse Wave Velocity, as explained below, higher than the real age.
Exclusion criteria: Active cancer, recent CVD event, smoking.
Approval: Contact with The Swedish National Board of Health and Welfare clearly stated that I, as a licensed physician, can use this type of supplement for my patients, if there is no reason to suspect unwholesome effects.

Analyses

Standard techniques for the Arteriograph were used[4] and gave values for aortic stiffness (pulse wave velocity, PWV), endothelial function in small arteries and arterioles (augmentation index, AIX), central and brachial blood pressure (cSBP, SBP, DBP). For the calculation of biological age values were used obtained from 1,036 analyses performed on my own Swedish patients. At their first visit to my clinic ("controls"), the calculations used were the following: PWV: Y=5.5 + 0.0571X; and for AIX: Y= -90 +1.0175X

Biological age was given as the age in my Swedish patients that had a mean value the same as the value found in the individual. A biological age higher than real age would indicate higher risk than for the controls.

Advanced glycation end products (AGE) was estimated in the skin of the right forearm by a fluorescence technique, using as reference for calculation of biological age values given by R Koetsier et al.[5] Increased values have been demonstrated in chronic diseases, e.g. peripheral artery disease.[6]

Erythrocyte fragility test[7] was used to estimate degree of inflammation and damage by an excess of free radicals (oxidative stress).

Treatment

The patients were given a daily dose of 12 tablets ANDOX, containing extracts of blueberry, grape seed, green tea, arctic raspberry, pollen and SOD (Mirorcle, Pte Ltd, Singapore).

Results

Twenty-seven patients completed the study. Three patients did not complete for reasons not related to intolerance for the preparation. Mean observation time was 4.04 months. Statistical treatment was made by paired t-test. For all variables except PWV a distinction was made between patients with normal and those with abnormal values at the start. Statistical significance is given as (*):p<0.1; *:p<0.05; **:p<0.01; ***: p<0.001, ns:not significant. (See **Tables 1-6** pp. 105,106).

Discussion

Most studies that have evaluated nutrient supplementation in the prevention and treatment of CVD have used single nutrients. The results of such studies have most often been negative, documented in many meta-analysis publications.[8] The background for the present study was the knowledge that CVD events are connected to a chronic inflammatory process, that a diet rich in antioxidants counteracts oxidative stress, but single antioxidants might not and that, therefore, antioxidants must be used as a multi-nutrient, not as a single component.

Conclusion

ANDOX tablet with a mixture of natural antioxidant-rich concentrates from blueberry, grape seed, green tea, arctic raspberry, pollen and SOD (Mirorcle Pte Ltd, Singapore) diminished several well-documented risk factors for cardiovascular disease.

Statement of Informed Consent

All patients were informed orally and in writing and provided their consent.

Competing interests

The author declares that he has no competing interests. ANDOX was made available by Mirorcle Pte Ltd, Singapore.

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Table 1. Aortic Pulse Wave Velocity, PWV, m/s. and Biological Age. Mean value. n=27.

Time	0	1	2	3	4 months
m/s	11.4	10.7*	10.0***	9.6***	9.1***
Biol. age	102.0	92.5*	79.3***	73.1***	65.3***

Real age 66.6. Biological age decreased by 37 years. CVD-risk diminished from much higher to the same as in the reference population.

Table 2. Augmentation index, AIX. Index and Biological Age. Mean values for all and for individuals with biological age higher than real age (>).

Group	n	0	1	2	3	4 months
All AIX	27	7.7	-7.1**	-12.2***	-13.1***	-21.2***
All biol. age	27	96.4	83.0*	78.1***	76.7***	70.0***
> AIX	25	15.5	-2.2**	-6.7***	-8.5***	-16.8***
> Biol. age	25	104.0	87.0*	82.0**	81.0**	73.0***

Individuals went from a much higher CVD-risk to a similar risk as in the reference population.

Table 3. Central systolic blood pressure (cSBP) in mmHg. Mean values. Similar configuration as in Table 2. Start values>140mmHg and <141mmHg shown separately.

Group	n	0	1	2	3	4 months
All	27	155.0	144.4***	137.9***	138.4***	135.7***
<	8	127.5	122.1ns	118.4*	119.4(*)	118.9(*)
>	19	170.7	157.1***	149.0***	149.3***	145.3***

A highly significant decrease to near normal in those with pathological start values. Possibly a small decrease in those with normal start values.

Table 4. Brachial Blood Pressure in mmHg. Mean Values. sbp Normal If <141mmHg and Dbp if <91mmHg.

SBP	n	0	1	2	3	4 months
All	27	150.9	143.6***	138.1***	138.6***	136.1***
<	8	126.0	123.6ns	118.1*	121.5ns	119.5(*)
>	19	165.1	155.0***	149.6***	148.4***	145.6***

DBP	n	0	1	2	3	4 months
Al	27	90.1	85.7***	84.9**	83.4***	81.8***
<	13	83.6	80.1*	79.8(*)	78.9*	77.0**
>	14	99.4	93.9**	92.2*	89.9***	88.7***

A highly significant decrease of abnormal values for both systolic and diastolic brachial blood pressure, but also a decrease for normal values.

Table 5. Oxidative Stress as Measured by Erythrocyte Fragility Test (6). Mean Values.

Group	n	0	4 months
All	27	15.9	8.2***
<11	16	4.6	3.0 ns
>10	11	21.1	9.9***

A highly significant antioxidant effect

Table 6. Advanced Glycation End Products. Mean Values, Given as Biological Age.

Group	n	0	4 months
All	20	68.7	64.5ns
Biol.age>	14	87.1	79.5**

A significant improvement in individuals with high risk.