

Effect of Proprietary blend of L-arginine on metabolic syndrome parameter in persons
with metabolic syndrome

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Abstract

Metabolic syndrome or Syndrome X composes of central obesity, high blood cholesterol and blood pressure, with the pivotal underlying state of insulin resistance. In today's world, this syndrome has a tremendous impact on a large scale of population. L-arginine is a basic natural amino acid and engaged on several metabolic pathways within the human body. It is served as a precursor for the synthesis, not only of proteins, but also of urea, polyamines, proline, glutamate, creatine and agmatine. The current interest in L-arginine is focused mainly on its close relationship with the important signal molecule nitric oxide (NO). The administration of L-arginine results in a significant improvement in endothelium-dependent dilation and positively affects the atherogenetic process.

Objective: The aim of this study is to evaluate whether the long-term administration of proprietary blend of L-arginine is able to ameliorate metabolic syndrome criteria in person with metabolic syndrome compared with the placebo.

Methods: We recruited 80 metabolic syndrome volunteers in this study. Each person was given the 90 sachets of proprietary blend or placebo powder (10 g) at random to consume 1 pack every day before bedtime in all subjects for 120-day period. And, the results were collected from the blood measurement on Fasting Blood Sugar, HDL and Triglyceride. After that, the measurement was taken on the waist circumference and blood pressure at day 0, 30, 60, and 90.

Results: The metabolic syndrome parameter changed in all groups. The proprietary blend group exhibited a high statistical significance in increasing the serum HDL, reduction of the FBS, and reduction of TG. For the SBP and DBP, there was no statistical significance between the 2 groups in every interval.

Conclusion: The proprietary blend of L-arginine exhibited a very promising effect in the reduction of the metabolic syndrome parameters compared to the L-arginine alone.

Keywords: L-arginine, Metabolic syndrome, Central Obesity, Insulin Resistance

Introduction

Research Background

Metabolic syndrome or Syndrome X which compose of central obesity, high blood cholesterol and blood pressure, with the pivotal underlying state of insulin resistance. This Syndrome affects in very large population today. Most of these victims are unaware of its presence due to insignificant symptoms . It affects one in five people in the United States and prevalence increases with age. Some studies have shown the prevalence in the USA to be an estimated 25% of the population

Metabolic syndrome is also known as metabolic syndrome X, cardiometabolic syndrome, syndrome X, insulin resistance syndrome, Reaven's syndrome (named for Gerald Reaven), and CHAOS (in Australia). A similar condition in overweight horses is referred to as equine metabolic syndrome; it is unknown if they have the same etiology which may lead to high risk of cardiovascular disease

L-arginine is a basic natural amino acid and engaged on several metabolic pathways within the human body.it served as a precursor for the synthesis not only of proteins but lso of urea,polyamines,proline,glutmate,creatine and agmatine. Current interest in L-arginine is focused mainly on its close relationship with the important signal molecule nitric oxide (NO).L-arginine is the only substrate in the biosynthesis of NO, which play critical roles in diverse physiological processes in the human body including neurotransmission, vasorelaxation, cytotoxicity and immunity.

The administration o L-arginine results in significant improvement in endothelium-dependent dilatation dilatation and positively effect the atherogenetic process. Although the effect of acute administration of L-arginine on insulin secretion in human is well known (Alfonso, et al.2000) little is known about the effect of long-term administration of L-arginine on insulin sensitivity in person with metabolic syndrome.

The drawback of the L-arginine itself is it's have very low stability profile, the combination to others nutrient to enhance the stabilization should be very more effective

The aim of this study is to evaluate whether long-term administration of proprietary blend of L-arginine is able to ameliorate metabolic syndrome criteria in person with metabolic syndrome.

Research objective

- 1.Study effect of proprietary blend of L-arginine in changing of metabolic syndrome parameter
- 2.Evaluate the life quality between proprietary blend of L-arginine usage group and pure arginine usage group

Materials and Methods

Research Population

We recruit 80 metabolic syndrome Volunteer into this study which can be categorized as 45 females and 35 males. With mean systolic blood pressure of 124.5 ± 10.6 mmHg, diastolic blood pressure of 87 ± 13.5 mmHg, Fasting blood glucose of 103 ± 9.7 mg/dL, Serum triglyceride of 170 ± 11.89 mg/dL, Female HDL of 44.59 ± 2.95 mg/dL, Male HDL of 37.11 ± 1.8 mg/dL, Female Waist circumference of 38.96 ± 4.52 inches, Male Waist circumference of 52.68 ± 4.21 inches.

Material

Proprietary blend of L-arginine composition per $\frac{1}{2}$ teaspoon (1.96 grams) :L-arginine 1 g(51%) Citric acid 0.49 g (25%) xylitol 0.27 g (14%) malic acid 0.1 g (0.75%) Citrus blend 0.05 g (2.4%) grape skin extract 0.01 g (0.75%) Vitamin C 0.01 g (0.6%) vitamin B6 0.39 g (0.02%) Folic acid 58.8 mcg (0.003%) Vitamin B12 0.39 mcg (0.002%)

Placebo : grape juice powder 6 g with pure L-arginine powder 4 g

The proprietary blend and the placebo will be packed in the sachet 10 gram per sachet in the sachet that will be identical to each of every sachet and divide into A and B group but will be numbered in A1-A40 and B1-B40 by third party. The researcher will know the composition in each sachet at the analysis after 90 days of consumption.

Method.

Subject will be divide into two group, 39 for control group and 41 for treatment group and will be given the 90 sachet A or B powder (10 g) at random which have to consume 1 pack everyday day before bedtime in all subject for 120 days period . And will be collected the blood for measurement o Fasted blood sugar, HDL and Triglyceride. Then measure the waist circumference and blood pressure at day 0 ,30,60 ,and 90.

Data analysis

The data will be statistically analysis by SPSS version 20 with Pair T-test in each group compare between treatment and placebo group

Result

	Before			1M		
	Placebo	Proprietary	P value	Placebo	Proprietary	P value
	M(SEM)	M(SEM)		M(SEM)	M(SEM)	
SBP(mmHg)	126.17(1.98)	125(3.15)	0.644	121.17(1.98)	117.94(2.42)	0.001
DBP(mmHg)	91.17(2.69)	88.23(3.85)	0.397	86.76(2.42)	81.17(2.89)	0.039
FBS (mg/dL)	104.11(2.43)	104.70(2.72)	0.612	104.11(2.43)	98.82(1.68)	0.009
TG (mg/dL)	169.41(2.84)	170.88(3.00)	0.619	169.41(2.84)	161.17(3.01)	0.109
HDL(mg/dL)	44.41(0.54)	44.76(0.87)	0.933	44.41(0.54)	49.76(0.87)	<0.001
WC(inches)(F)	41.00(1.02)	37.92(0.35)	0.215	41.00(1.02)	37.82(0.35)	0.215
WC(inches)(M)	52.00(0.76)	53.76(1.17)	0.819	52.00(0.76)	53.52(1.10)	0.236
	2M			3M		
	Placebo	Proprietary	P value	Placebo	Proprietary	P value
	M(SEM)	M(SEM)		M(SEM)	M(SEM)	
SBP(mmHg)	121.17(1.98)	115.29(1.93)	0	121.17(1.98)	115.29(1.93)	0.007
DBP(mmHg)	86.76(2.42)	76.47(1.90)	0	86.76(2.42)	76.47(1.90)	<0.001
FBS (mg/dL)	100(1.71)	97.05(1.13)	0.493	104.11(2.43)	97.05(1.13)	0.001
TG (mg/dL)	169.41(2.84)	145(1.23)	0	169.41(2.84)	145(1.23)	<0.001
HDL(mg/dL)	44.41(0.54)	51.29(0.40)	0	49.47(0.82)	51.29(0.40)	0.02
WC(inches)(F)	41.00(1.02)	34.52(0.31)	0	40.00(1.02)	34.52(0.31)	<0.001
WC(inches)(M)	51.11(0.70)	52.41(1.16)	0.334	51.11(0.70)	52.41(1.16)	0.334

Table 1. Change in Metabolic syndrome parameters by Proprietary blend of L-arginine and Placebo

- SBP= systolic blood pressure , DBP = diastolic blood pressure, FBS = fasted blood sugar, TG = serum triglyceride, HDL = Serum High density Lipoprotein, WC = Waist circumference

	Before			1M		
	baseline	Proprietary	%diff*	baseline	Proprietary	%diff*
	M(SEM)	M(SEM)		M(SEM)	M(SEM)	
SBP(mmHg)	126.17(1.98)	125(3.15)	0.93%	126.17(1.98)	117.94(2.42)	6.52%
DBP(mmHg)	91.17(2.69)	88.23(3.85)	3.22%	91.17(2.69)	81.17(2.89)	10.97%
FBS (mg/dL)	104.11(2.43)	104.70(2.72)	0.57%	104.11(2.43)	98.82(1.68)	5.08%
TG (mg/dL)	169.41(2.84)	170.88(3.00)	0.87%	169.41(2.84)	161.17(3.01)	4.86%
HDL(mg/dL)	44.41(0.54)	44.76(0.87)	0.79%	44.41(0.54)	49.76(0.87)	12.05%
WC(inches)(F)	41.00(1.02)	37.92(0.35)	7.51%	41.00(1.02)	37.82(0.35)	7.76%
WC(inches)(M)	52.00(0.76)	53.76(1.17)	3.38%	52.00(0.76)	53.52(1.10)	2.92%
	2M			3M		
	baseline	Proprietary	%diff*	baseline	Proprietary	%diff*
	M(SEM)	M(SEM)		M(SEM)	M(SEM)	
SBP(mmHg)	126.17(1.98)	115.29(1.93)	8.62%	126.17(1.98)	115.29(1.93)	8.62%
DBP(mmHg)	91.17(2.69)	76.47(1.90)	16.12%	91.17(2.69)	76.47(1.90)	16.12%
FBS (mg/dL)	104.11(2.43)	97.05(1.13)	6.78%	104.11(2.43)	97.05(1.13)	6.78%
TG (mg/dL)	169.41(2.84)	145(1.23)	14.41%	169.41(2.84)	145(1.23)	14.41%
HDL(mg/dL)	44.41(0.54)	51.29(0.40)	15.49%	44.41(0.54)	51.29(0.40)	15.49%
WC(inches)(F)	41.00(1.02)	34.52(0.31)	15.80%	41.00(1.02)	34.52(0.31)	15.80%
WC(inches)(M)	52.00(0.76)	52.41(1.16)	0.79%	52.00(0.76)	52.41(1.16)	0.79%

Table 2. % difference of parameters from baseline

Discussion

As shown in the table. The metabolic syndrome parameter was changed in all groups. Which can be concluded that the L-arginine itself can affect the metabolic syndrome parameter. As in the comparison with Proprietary blend group, the proprietary blend group seems to have more statistical significantly in reduction of the Metabolic syndrome parameter than in the placebo group , especially in the first and second months treatment. In both placebo and proprietary bland group for the waist circumference reduction less seems to have less effect . The proprietary bland group have very statistical significance in increasing the serum HDL, reduction of the FBS, reduction of TG . For the SBP and DBP there have no statistical significance between 2 groups in every time interval. The proprietary blend is compose of many health beneficial nutrient such as vitamin B and vitamin C with grape skin extract that can be useful for the person with metabolic syndrome and enhance the stability of the L-arginine.

Conclusion

The Proprietary blend of L-arginine shown very promising effect in reduction of the metabolic syndrome parameters compare to the L-arginine alone. The further investigation should be follow on for the use of L-arginine with any others formulation for improve the beneficial of the L-arginine

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