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Full Length Research Paper

Effect of "WuQinXi" exercise on blood lipid levels and the antioxidant enzyme activities in aged practicers

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This study was designed to test the effect of "WuQi nXi" exercise on blood lipid levels and the antioxidant enzyme activities in aged practicers. Results showed that 30 days of "WuQinXi" exercise could significantly lower the serum levels of TC, TG and LDL-C, while increasing the serum level of high density lipoprotein cholesterol (HDL-C) and activities of SOD and CAT.

Key words: "WuQinXi" exercise, aged participant, SOD and TC.

INTRODUCTION

Qigong or chi kung (pronounced "chee-gong") is a practice of aligning breath, movement, and awareness for exercise, healing, and meditation (von Trott et al., 2009). With roots in Chinese medicine, martial arts, and philosophy, qigong is traditionally viewed as a practice to balance qi (chi) or intrinsic life energy (Jouper and Hassmén, 2009). Typically a qigong practice involves rhythmic breathing, coordinated with slow stylized repetition of fluid movement, and a calm mindful state (Skoglund et al., 2011). For many people, particularly those who are overweight or have been largely sedentary for long periods of time, gentle development of increased levels of exercise are needed. Mindful exercise approaches, such as yoga and qigong have great potential in this regard and have the added potential benefit of increasing mindfulness. In view of it principle of integrating and harmonizing one's mind breath posture and movement (Ng and Tsang, 2009), qigong may be a useful approach to adopt with people diagnosed with schizophrenia.

Five animals exercises (WuQinXi in Chinese) is to imitate the movements of tigers, deer, bears, monkeys and birds, students like to learn Wuqinxi because it is for physical and breathing exercises for health care. Wu qin xi is developed by the Chinese well-known physician; Hua Tuo in the second century in the ancient times. In this study, we investigate the effect of "WuQinXi" exercise on blood lipid levels and the antioxidant enzyme activities in aged practicers.

Abbreviates: TC, Total cholesterol; **TG,** triacylglycerol; **HDL-C,** high-density lipoprotein cholesterol low-density lipoprotein cholesterol; **LDL-C,** malondialdehyde; **MDA,** levels; **SOD,** superoxide dismutase; **CAT,** catalase.

SUBJECT AND METHODS

Participants

The participants were recruited to participate in the study (Canada Vancouver Richmond city) from 20 July, 2010 to 18 August, 2010. The sample was composed of 64 healthy older people (41 women and 23 men; mean age of 60.3 ± 5.61 years) who were living in Canada Vancouver Richmond. All individuals were asked to practice "WuQingXi" for 60 min in the morning every day and had last for 30 days. Blood were taken from all participants at the 10, 20 and 30 day. Blood were used for the measurement of TC, TG, LDL-c, HDL-c, glucose, MDA levels and SOD, CAT activities.

Statistical analysis

Statistical analysis was performed using SPSS version 10.0 (SPSS Inc., Chicago, IL, USA). Student's t test was used to compare the differences in biochemical parameters between groups. Fisher's exact test was used for sex distribution comparison. ANOVA for repeated measures (3 target sizes) was used to compare the hand

Table 1. Effect of "WuQingXi" exercise on blood TC, TG and LDL-c levels.

Time (day)	TC /mmol·L^{-1}	TG/mmol·L^{-1}	LDL-c/mmol·L^{-1}
0	6.03±0.43	2.65±0.13	4.42±0.09
10	5.84±0.27 *	2.31±0.11 *	4.16±0.08 *
20	5.47±0.22 **	2.18±0.14 **	3.92±0.08 **
30	4.98±0.18 **	2.09±0.09 **	3.75±0.06 **

* $p < 0.05$, ** $p < 0.01$, compared with these measurement data (0 day).

Table 2. Effect of "WuQingXi" exercise on blood HDL-c level.

Time (day)	HDL-c/mmol·L^{-1}
0	1.41±0.08
10	1.59±0.05 *
20	1.87±0.07 **
30	2.03±0.09 **

* $p < 0.05$, ** $p < 0.01$, compared with these measurement data (0 day).

movement parameters. Statistical significance was set at $p < 0.05$.

RESULTS AND DISCUSSION

Effectiveness of rosuvastatin in reducing TC and LDL-C was observed in various studies (Yamamoto et al., 2002; Olsson et al., 2001; Paoletti et al., 2001; Davidson et al., 2001). Reduction in TG and increase in HDL-C is seen in both the groups. These results are consistent with those previously reported for rosuvastatin treatment in hypercholesterolemic patients (Yamamoto et al., 2002). An atherogenic NHDL-C contain VLDL-C, IDL, LDL-C and lipoprotein (a) the NHDL-C can be used as tool for lipprotein cholesterol screening (Frost and Havel, 1998) and assessment of risk and therapy as per NCEP-III guideline (Expert panel on detection, evaluation and treatment of high blood cholesterol in adults, 2001), reduction of NHDL-C is a secondary goal in reducing CHD events. It was seen that rosuvastatin significantly reduced NHDL-C overperiod of 8 weeks at the dose of 10 mg/day. A comparative study of atorvastatin vs. Simvastatin reduced ratio of NHDL-C.HDL-C (39 to 33%) at 16 week (Davidson, 1997). The same effect was produced by rosuvastatin (10 mg) in 8 week. However, rosuvastatin can slao cause some side effect and toxicity. "WuQingXi" exercise cannot cause any side effect and toxicity. Therefore, study of effect of "WuQingXi" exercise on blood lipids become useful and valuable.

Table 1 shows a significant decrease of the blood TC, TG and LDL-c levels in all participants. It could be found that the blood TC, TG and LDL-c levels in all participants were decreased in a time-dependent manner.

We observed a significant increase of the HDL-c level ($p < 0.01$) (Table 2) in all participants. Statistical analyses revealed significant statistical differences ($p < 0.01$) between different exercise time (0, 10th, 20th and 30th day) points. This indicated that "WuQinXi" exercise can reduce blood lipid levels in aged practicers.

The blood sugar concentration or blood glucose level is the amount of glucose (sugar) present in the blood of a human or animal. Normally in mammals, the body maintains the blood glucose level at a reference range between about 3.6 and 5.8 mM (mmol/L, that is, millimoles/liter), or 64.8 and 104.4 mg/dl (Bergenstal et al., 2005). The human body naturally tightly regulates blood glucose levels as a part of metabolic homeostasis. Glucose is the primary source of energy for the body's cells, and blood lipids (in the form of fats and oils) are primarily a compact energy store. Glucose is transported from the intestines or liver to body cells via the bloodstream, and is made available for cell absorption via the hormone insulin, produced by the body primarily in the pancreas. Blood glucose levels that remain high over time can damage your eyes, kidneys, nerves, and blood vessels (Hassen et al., 2010).

We observed a decrease trend of the blood glucose level ($p < 0.01$) (Table 3) in all participants. Statistical analyses revealed non-significant statistical differences ($p > 0.05$) between different exercise time (0, 10th, 20th and 30th day) points. This indicated that "WuQinXi" exercise cannot significantly reduce blood glucose level in aged practicers. A possible reason is that 30 days of "WuQinXi" exercise is too short to reduce blood glucose level in aged practicers.

Lipid peroxidation represents oxidative tissue damage caused by hydrogen peroxide, superoxide anion and hydroxyl radicals, resulting in structural alteration of membrane with release of cell and organelle contents, loss of essential fatty acids with formation of cytosolic aldehyde and peroxide products (Drummen et al., 2004).

Table 3. Effect of "WuQingXi" exercise on blood glucose level.

Time (day)	Blood glucose/mmol·dl^{-1}
0	5.72±0.29
10	5.68±0.41
20	5.61±0.04
30	5.59±0.053

Table 4. Effect of "WuQingXi" exercise on blood MDA level and SOD, CAT activities.

Time (day)	MDA	SOD	CAT
0	7.05±0.69	215.9±22.17	54.86±6.09
10	5.24±0.66 **	301.8±31.09 **	78.21±6.99 **
20	4.62±0.59 **	352.7±39.75 **	83.11±9.03 **
30	3.87±0.42 **	408.3±48.31 **	89.52±10.63 **

** $p < 0.01$, compared with these measurement data (0 day).

Malondialdehyde is a major end product of free radical reaction on membrane fatty acids. Although the cell is endowed with several antioxidant systems to limit the extent of lipid peroxidation, under certain conditions protective mechanism can be overwhelmed, leading to elevated tissue levels of peroxidation products (Pinchuk et al., 2011). Superoxide dismutase (SOD), one of the important intracellular antioxidant enzyme present in aerobic cells has antitoxic effect against superoxide radical (Fridovich, 1995). Catalase (CAT) protects the cells from accumulation of H_2O_2 by decomposing it to H_2O and O_2 (Chance et al., 1979). Malondialdehyde (MDA) is the end product of the lipid peroxidation, while SOD, CAT and other antioxidants are involved in the elimination of free radicals. They are assumed to represent pro-oxidant and antioxidant factors respectively in the cellular free radical metabolism. The balance of these two decides the net result of cellular and/or tissue oxidation/peroxidation state.

As shown in Table 4, blood MDA level in all participants significantly decreased, whereas blood SOD, and catalase activities were markedly increased with the prolonging exercise time. This indicated that "WuQinXi" exercise can reduce oxidative injury and enhance blood antioxidant enzyme activities in aged practicers.

Conclusion

Thirty days of "WuQinXi" exercise can decrease blood lipids levels and oxidative injury in old practicers. "WuQinXi" exercise is useful for old peoples' health.

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