EFFECTS OF EXERCISE ON OXIDATIVE STRESS AND RELATED FACTORS OF OBESE YOUNG WOMEN

YONGCHENG GAO
Department of Physical Education, Tianshi College, Tianjin, 301700, China

ABSTRACT

Aim: To analyze oxidative stress in obese young women and the influences of relative factors. Method: By using medical determination and experimentation methods, 2100 obese young women admitted by different hospitals from January 2013 to December 2015 were chosen as subjects compared to 2100 female college students who had physical examinations during the same period. By dividing them into obesity group and control group, body mass index, inflammatory reaction index plasma hsCRP and HOMR-IR were compared.

Result: The level of plasma 8-epi-PGF2 α in the obesity group was significantly different compared with control the group and was positively correlated with indexes such as BMI. After jogging and resistance exercise, plasma 8-epi-PGF2 α improved significantly.

Conclusion: Jogging and resistance exercise affect oxidative stress and body mass index in obese young women.

Key words: Exercise, Young women, Obese, Oxidative level, Relative factors, Effect.

Received February 15, 2016; Accepted March 02, 2016

Introduction

With development and progress in current medical treatment, research on obesity and related diseases has attracted more and more attention. When weight cannot be effectively controlled, it leads to obesity (Figure 1).

Exercise can have a certain effect on oxidative stress, but the effect of exercise on inflammatory response factors is not very clear. The author studied young women who had physical examination during the period from January 2013 to December 2015, specifically the oxidative stress level of obese young women as well as the close relationship between obese weight and insulin resistance and inflammatory factors, to analyze the effect of exercise and some related factors.

This paper discusses factors relative to obese oxidative stress, providing a strong theoretical basis for the study of diseases related to obesity, and by using scientific and effective methods of exercise therapy, provides some guidance for the treatment of related complications in the obese. As control subjects 2100 physical examinees with normal weight preceded the comparative analysis.

Figure 1: Picture of Obesity Patient. (Picture Source: Chen Haichun, Li Xun, Li Jianrong. Effect of Exercise on Oxidative Stress Level Related Factors of Young Women Obese Patients [J]. Journal of Chengdu Sport University, 2012, 02:86-90)
Method

General data
A random selection of 2100 female college students in different colleges and universities from 18 to 24 years old, and 2100 female college students with normal weight were studied. The classification of indicators for selecting obesity complies with the relative criteria of obesity in Asian adults who work on international obesity. Setting the observation index of the two groups as obesity group and control group, the body mass index (BMI) of control group members was 22kg per square meter; patients who suffer from hypertension, cardiovascular diseases and infectious diseases were excluded. Patient indictors such as blood routine, renal function and liver function were checked.

Research method

Medical Determination
Routine medical tests were performed on the two groups and their biological indexes were determined. 8ml of blood was drawn from the two groups of patients while fasting, and smoking as well as drinking were prohibited before the blood test\(^1\). The extraction of 4ml venous blood was used to detect plasma 8-epi-PGF2\(\alpha\), and another 4ml blood was separated using high speed centrifuge to detect the insulin, blood glucose and cholesterol levels in examinees\(^2\). During the process of detecting blood glucose, the method of glucose oxidase was adopted, and cholesterol wiping of buttocks adopted cholesterol oxidase\(^3\).

Experimentation Method
The research on examinees was conducted by using experimental methods. The independent variable was: two types of exercise, jogging and resistant exercise on the basis of jogging; The dependent variable was: the variation of indictors such as body mass index due to different forms of movement; the control variable was: while the examinees exercised in different ways, their diet was also controlled properly e.g. the balance between salt intake and fat intake. Jogging training method: after 5 minutes of slow motion, the stretching of muscles was conducted; exercise forms: the frequency of jogging was about 4 times every week and exercise for 50 minutes each time, then 5 minutes of relaxation. Jogging and resistance movement: after 5 minutes of stretching and slow motion, exercise 4 times of each week and 50 minutes or so (the former 30 minutes jogging and the later 20 minutes resistance exercise. 60% to 80% of jogging strength is maximum heart rate and the main content of the resistance movement is to perform 3 groups of supine lift and four groups of kicking motion with each practice time being 1 minute.

Statistical method
The SPSS17.0 statistical software was used in this study and the related measurement data in the study process was indicated by using \((\bar{x} \pm s)\) as well as test by using \(t\). If the final test result is \(P<0.05\), it indicates the statistical difference is significant.

Results

• The relevant clinical data of the two groups were observed before testing. There were no significant differences between the obesity group and control group in shrinkage pressure and systolic blood pressure and fasting blood glucose level, while there was significant statistical difference between the body mass indexes. After statistical calculation of the relative indexes of two groups, \(P<0.05\) and the difference is statistically significant.

• Comparing the biochemical indexes of the obese group and control group before and after test, there were significant differences in plasma 8-epi-PGF2\(\alpha\) index. There were differences between oxidative stress level and inflammation response factors, which indicate that there is significant insulin resistance phenomena in the obese group\(^4\).

• Analysis of correlation between oxidative stress index and the plasma 8-epi-PG2\(\alpha\) in the obese group. By analyzing the oxidative stress level of the obese, it can be found that there is a significant positive correlation between plasma and BMI.

• After experimental intervention in the obese subjects, the influence of weight indexes for the obese has positive significance. After jogging and resistance exercise, the weight of exercisers can be effectively reduced, and then the body mass index can be reduced to minimum, and its oxidative stress levels can be seriously affected\(^5\).

• The level of inflammatory response in obese young women. C reactive protein (Figure 2) is an iconic inflammatory marker, which is mainly synthesized by the liver. Along with the continuous development of medical treatment standards in recent years, it has been found that human adipose
tissue is not only able to store energy but also to secrete it, and further to secrete a variety of cytokines.\(^6\)

**Figure 2:** Picture of C reactive protein. (Picture Source: Shi Lingyan. Relation among Oxidative Stress Level, Obesity and Type 2 Diabetes [J]. Diabetes New World, 2015, 08: 237-238)

These cytokines mainly protect CPR, which is also a common Adipocyte Factor (Figure 3).

**Figure 3:** Picture of Adipocyte Factor. (Picture Source: Liu Liqing, Yang Shuye. Effect of Kwando Aerobics on Recessive Obesity Composition of Middle-aged Women [J]. China School Physical Education (Higher Education), 2015, 05: 88-92)

Clinical studies have shown that CPR is a key predictor of type 2 diabetes, and it has positive significance in the prediction and treatment of patients with atherosclerosis (Figure 4).

**Figure 4:** Picture of atherosclerosis. (Picture Source: Lai Ai’ping, Chen Wenhe. Effect of Weight Reducing Exercise on ATPase Enzymatic Activity and Ectropion of Red Cell Membrane Phosphatidylserine of obese children [J]. China Sport Science and Technology, 2011, 05: 141-145)

Insulin resistance is a biological response to insulin in the whole group.\(^7\). Obese subjects have complications such as IR and so on, which is a common phenomenon among the obese and has been a very important vinculum in the pathogenesis of obesity. It can cause the body glucose intolerance phenomenon, and start a serious blood lipid disorder. Endothelial IR can also reduce the content of nitric oxide in vivo, leading to the impairment of the function of endothelial cells dependent on vascular diastolic, which result in the appearance of abnormal phenomena in endothelia function and then lead to the occurrence of the phenomenon of atherosclerosis. It is not conducive to health in the obese.\(^8\)

**Conclusion**

Jogging has a serious impact on oxidative stress level in obese young women, which can effectively reduce the level of oxidative stress and there is a positive correlation between levels of inflammatory reaction and oxidative stress levels. Exercise can improve the level of oxidative stress, thereby it protects the obese from diabetes mellitus and reduces the incidence of diabetes. Exercise and weight loss are interrelated: exercise and weight loss can reduce cardiovascular disease in the obese and avoid the appearance of severe metabolic disorders. The benefit of exercise is to reduce the weight of the obese and improve the fat cells.\(^9\) After movement, the obese can also enhance oxygen consumption, effectively promote fat phenomena, reduce weight, enhance the quality and volume of muscle, and improve the physical distribution in form, so as to be able to effectively reduce the oxidative stress level.\(^10\)

In short, exercise can not only reduce the number of fat cells, but also effectively improve the function of fat cells. So it can effectively improve oxidative stress levels and the inflammation reaction, and then the effects of obesity on the body can be reduced to a minimum. Therefore, the obese should choose ways which are conducive to the prevention and treatment of obesity, and thus contribute to the health of the body. Therefore, to improve health, the obese should do jogging and comparable exercise, and then maintain their own health in at a normal level.

**References**

6) Liying Zhang, Yazhuo Xue, Min Li. Research Progress in Movement to Lipoprotein Metabolism [J]. Journal of Taishan Medical College, 2013, 8(09): 716-720.

Corresponding author
YONGCHENG GAO
Department of Physical Education, Tianshi College
Tianjin, 301700 (China)