EFFECT OF AEROBIC BADMINTON COMBINED WITH DIET CONTROL ON BLOOD GLUCOSE AND BLOOD LIPID IN PATIENTS WITH METABOLIC SYNDROME

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ABSTRACT

1000 metabolic syndrome patients were selected to explore the improvement effect of diet control combined with aerobic badminton exercise on insulin resistance, blood lipids, and blood glucose index of patients with metabolic syndrome (MS), and provide more reasonable and scientific medical guidance and help for treatment of related disease in the future. At the same time, 1000 patients with the same circumstances in the same period were selected as control group to be treated with simple diet control. Blood pressure, insulin resistance, blood lipid and blood glucose of the two groups before and after intervention were recorded and analyzed. The results show that improvement of blood glucose and blood lipids in observation group patients was significantly better than that of control group patients, the difference between the two groups p<0.05, was statistically significant. The results confirmed that diet control combined with aerobic badminton exercise can effectively reduce blood pressure in patients with metabolic syndrome, with positive regulation of lipid metabolism, glucose metabolism and insulin resistance of metabolic syndrome patients. Compared with other forms of treatment, the combination of exercise and diet control is safer and healthier, without unnecessary harm and side effects. In future treatment, diet control combined with aerobic badminton is recommended to be widely used for metabolic syndrome patients and improve their quality of life.

Key words: Aerobic Badminton, Metabolic Syndrome, Blood Glucose, Blood Lipid, Improvement Effect.

Introduction

Metabolic syndrome refers to a pathological state of metabolism, a disorder of the body’s protein, fat, carbohydrates and other substances. As a complex metabolic disorder, it is risk factor causing diabetic cardiovascular disease (Figure 1).

1) There are multiple metabolic disorders: obesity, hyperglycemia, hypertension, dyslipidemia, high blood viscosity, high uric acid and high fatty liver occurrence rate and hyperinsulinemia. These metabolic disorders are the pathological basis of heart, brain, vascular disease, and diabetes. Diabetes is not an isolated disease but one of the components of metabolic syndrome(1).

2) There is a common pathological basis: at present, it is believed that the common cause of the disease is obesity, especially insulin resistance and hyperinsulinemia caused by central obesity (Figure 2).

3) It can cause an increase in a variety of diseases, such as hypertension, coronary heart disease, stroke and even certain cancers such as breast cancer related to sex hormones, uterine endometrial cancer, prostate cancer, and pancreatic cancer, hepatobiliary cancer, colon cancer, etc. in the digestive system(2-4).

4) There are common prevention and treatment measures, which are conducive to prevention and treatment of other metabolic disorders.
At present, the etiology of metabolic syndrome is not yet clear. Some researchers consider the cause of the disease to be genes and multiple environmental interactions, which has a close relationship with inherited immunity. The disease is influenced by multiple environmental factors, with concentrated expression in a high fat, high carbohydrate diet, increased insulin resistance, decreased labor intensity, reduced exercise, which contribute to the development of metabolic syndrome.

At present, most patients with metabolic syndrome are treated by diet control, but in terms of improvement of blood glucose, blood lipid and other indicators, the effect of intervention is unsatisfactory. Aerobic badminton exercise has been greatly loved by broad masses of people. In recent years, with continuous progress and development of medicine, most medical personnel have begun to gradually realize the beneficial effect of aerobic exercise. Relative investigations show the following benefits of aerobic badminton training.

1) Heart: badminton will continuously enhance heart and cardiovascular system function. While increasing maximum oxygen intake, oxygen transmitted to various organs of the body is greatly increased, so that the work quality of various organs naturally improves. In addition, badminton will accelerate blood circulation, so that the coronary artery provides sufficient blood supply to the heart muscle, which thus prevents a variety of heart diseases. Through movement of the whole body, venous blood flows to the heart, prevents venous thrombosis;

2) Blood: with a strong cardiovascular system, blood quality is better that of normal people and the body’s adaptive change to long-term badminton can improve metabolism, reduce blood fat and cholesterol;

3) Lungs and respiratory system: long-term badminton exercise enhances pulmonary function and increases vital capacity, and long-term regular badminton can develop pulmonary respiratory muscle, so that each ventilation is larger and pulmonary function is enhanced;

4) Liver: normally, the surface of the healthy liver has clear vascular vein texture, but because of bad habits of work and rest, eating, etc. this situation is very rare. Aerobic badminton exercise can effectively eliminate fatty liver and guarantee health and safety. This investigation effectively integrates diet control and aerobic badminton sport to treat metabolic syndrome patients.

Method

2000 patients with metabolic syndrome who received treatment from January 2014 to June 2015 were selected as study subjects. Among them, there were 1136 males and 864 females; the patients were aged between 32 and 54 years, average 39.5± 4.3 years old. The two groups of patients were clear about the purpose and significance of this investigation and voluntarily participated in this study. The basic characteristics of the two groups were not significantly different, hence appropriate for comparison.

Inclusion and Exclusion Criteria

All 2000 patients were classified as metabolic syndrome, as follows:

1) Overweight and/or obesity BMI ≥25;
2) High blood glucose and fasting blood glucose (FPG) ≥ 6.1mmol/L (110mg) and/or 2hPG ≥ 7.8mmol/l (140mg / dl), and/or patients diagnosed and treated as diabetes;
3) Hypertension systolic/diastolic blood pressure ≥140/90mmHg, and/or patients diagnosed and treated with hypertension;
4) Dyslipidemia fasting blood triglyceride ≥1.7mmol/L (150 mg/dl), and/or fasting blood HDL-C <0.9mmol/L (35mg/dl) (male), <1.0mmol/L (39mg/dl) (female).

Intervention measures

Control group patients were treated with routine dietary intervention. The diet adhered to princi-
ple and standards of low salt, low cholesterol, low calorie (calculated based on daily amount of activity, obesity degree), high cellulose. [9-10] In order to ensure smooth implementation of diet controls, professional nursing staff were used to provide comprehensive diet education for patients and their families, and perform comprehensive supervision and management of daily diet.

Observation group patients had the same diet control method as control group patients and had aerobic badminton exercise treatment in addition. Patients had exercise load testing and physical examination one day before exercise to develop the intervention program and ensure safety and effectiveness. Patients had aerobic badminton exercise 3~5 times per week on average, lasting 30 minutes each time, with actions shown in Figure 3. The aerobic exercise lasted 4 weeks.

Figure 3: Aerobic badminton exercise.

Comparison method
Fasting blood glucose was measured by the oxidase method, blood lipids were measured by the enzyme method, free fatty acid (FFA) was measured by enzyme colorimetric method, fasting serum insulin was measured by radioimmunoassay. The search was determined by enzyme linked immunosorbent assay (ELISA), insulin resistance index (IRI) and was calculated by homeostasis model assessment. Also, combi fitness station body composition analyzer was used to measure the test object body shape indexes such as height, weight, and body fat percentage one day before combined intervention and the first day after the end of intervention, with body mass index (BMI, weight in kg / height in m) calculated.

Statistical method
Analysis of the improvement effect of aerobic badminton combined with diet control on blood glucose and blood lipid in patients with metabolic syndrome adopted SPSS19.0 statistics software for integration and processing of all data, with count data denoted by n,%, measurement data denoted by ( x±s). When the difference value was P<0.05, the difference was statistically significant.

Results
After a month of intervention, body weight, body fat rate and BMI reduction of the observation group was significantly better than those of the control group, with statistical significance (P < 0.05).

Blood lipid level of observation group was also remarkably improved compared with the control group, with a statistically significant difference, P<0.05. Male TC decreased from 4.39±0.82mmol/L to 3.21±0.63 mmol/L; female TC decreased from 4.34±0.84mmol/L to 3.62±0.55mmol/L; male TG decreased from 01.59±0.62mmol/L to 0.69±0.41mmol/L; female TG decreased from 1.32±0.61mmol/L to 0.76±0.30mmol/L; male LDL-C decreased from 2.57 ± 0.54mmol/L to 1.98±0.47mmol/L, female LDL-C decreased from 2.48 ± 0.77mmol/L to 2.13± 0.42mmol/L, with HDL-C significantly lower after four weeks, but the ratio of HDL-C/LDL-C increased significantly P<0.05.

Discussion
Aerobic exercise effectively improved obesity degree, the insulin level of metabolic syndrome patients, improved insulin sensitivity, effectively reduce the total cholesterol, triglyceride, low density lipoprotein cholesterol level, and improved lipid metabolism. With such very positive action in the treatment of metabolic syndrome patients, it may be recommended in clinics to achieve enhancement of the quality of life of metabolic syndrome patients.

In addition to the above interventions, if the patient’s condition is relatively serious, drug therapy should be added. First, to reduce insulin resistance, and metformin and insulin sensitization thiazolidinediones drugs are commonly used to increase insulin sensitivity. But the mechanism of the two in treatment of metabolic syndrome differs greatly, so medical personnel must carry out comprehensive analysis of the illness conditions. Second, to improve dyslipidemia, lipid-lowering therapy plays a very important role in metabolic syndrome, with common drugs such as fibrates and statins.
References


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