Original Article

Study on the Effect of Single Exercise Intervention on Students with Impaired Glucose Tolerance

K. W. Dong[1,2], X. X. Xue[1]

[1]Department of Medicine, Wuhan Sports University, Wuhan, China, [2]Department of Medicine, Moscow State Academy of Physical Education, Moscow, Russia

Abstract

Objectives: The aim of this study is to study the effect of single exercise intervention on students with impaired glucose tolerance (IGT). **Methods:** In this study, 25 patients with low glucose tolerance in a university in JX were selected as the study participants and randomly divided into control group and observation group. In the control group, 12 cases were treated with routine motion intervention, whereas 13 cases in the observation group were treated with single exercise intervention of moderate-intensity level running. The training period was 15 weeks, six times a week, and 2 h a time. Moreover, two groups of IGT students' glycated hemoglobin level, waist circumference, and insulin were observed and recorded. **Results:** Compared with the control group, the insulin level in the observation group was significantly lower than that in the control group, and the difference between the two groups was statistically significant ($P < 0.05$). The level of hemoglobin in the observation group was significantly lower than that of the control group, and there was significant difference between the two groups ($P < 0.05$). The waist circumference of the observation group was significantly lower than that of the control group. There was a significant difference between the two groups ($P < 0.05$). **Conclusions:** Single-phase motion intervention can effectively reverse the decrease of sugar content of college students and has certain application value.

Keywords: Glycated hemoglobin level, insulin, waist circumference

Introduction

Impaired glucose tolerance (IGT), or impaired glucose tolerance, is a normal condition for fasting blood glucose, elevated blood glucose after loading, and an abnormal state between normal and diabetes mellitus. IGT plays an important role in the natural course of diabetes. It is one of the prediabetes manifestations and a dangerous stage of type 2 diabetes.[1] The development of diabetes is a chronic process, reduced physical activity, and excessive calorie intake is the most important factor of IGT popular in the world, the IGT stage nursing intervention related to diet and exercise is a key link in diabetes prevention. At present, for the study of exercise intervention around the age of 45 years, IGT populations has become a hot topic, but has not yet access to the literature for young female IGT exercise intervention in this group of College students. In this study, IGT young female college students as the research object, from the starting time, exercise intensity to study the individual effects of exercise intervention on postprandial blood glucose and insulin after a meal.[2]

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Overview

Combined with the nursing experimental class of patients with endocrine system diseases in internal medicine nursing, it is convenient to select female college students majoring in nursing as the objects of investigation and screening. There are 1163 students of 2007, 2008, and 2009 graduates completed the 2-h blood glucose screening after lunch, and 32 students' (2.75%) blood glucose was more than 7.8 mmol/L,[3] and 26 of them is IGT, and 25 students voluntarily accepted the study and signed the informed consent.

Methods

In this study, 25 patients with low glucose tolerance in a university in JX were selected as the study participants and

Address for correspondence: Dr. K. W. Dong, Wuhan Sports University, Wuhan, China. Moscow State Academy of Physical Education, Moscow, Russia. E-mail: li2000985@gmail.com

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Gradually increase the intensity from the initial movement, achieve the desired target heart rate within 5 min, and maintain this state to stop at 30 min.[5] In the process of sportswear and energy consumption monitoring, respectively, in 5, 15, 25 movement min self-testing radial pulse three times, respectively, control the intensity range at the required rate of 40%, 60%, and 80% Vo2 max target.

Results

The difference of independent baseball umpires association (IBUA) between the observation group and the control group was statistically significant ($P < 0.05$), and the difference of incremental area under the curve (IAUC) in the observation group was statistically significant ($P < 0.05$) compared with the control group ($P < 0.05$). The difference of GAUC between the observation group and the control group was statistically significant ($P < 0.05$), indicating that the moderate-intensity movement of each initial time was reduced. Low GAUC and IAUC, and with 30 min, 15 min, and 90 min 60 min by IAUC equivalent effect, IAUC is better than 30 min and 60 min at 15 min and 90 min to reduce. It can be seen that starting from 30 min after lunch,[6] exercise has a good effect on reducing IGT, and 180 min after exercise can reduce GAUC and IAUC [Table 2].

Exercise intervention with low intensity 40% and high intensity 80% was conducted at the starting time point of minimum IAUC after lunch. Results in the control group after exercise 60 min, mean blood glucose was 8.90 mmol/L higher than 15 min 8.21 mmol/L, have increased immediately after exercise and then began to decline; the observation group 45 min, 60 min and mean blood glucose was 4.86 mmol/L and 5.31 mmol/L, which was significantly lower than that of 15 min, with the after 90 min (8.53 Mmol/L), 120 min (9.85 mmol/L) and higher than the level before the rapid movement, to 180 min (6.69 mmol/L) has not recovered to 0 points level. The insulin levels after exercise group increased gradually to 90 min reached the peak of 40.13 mIU/L, the observation group decreased after control;[7] insulin values peak 47.65 mIU/L at 45 min, and then declined rapidly to 9.78 mIU/L (90 min) the minimum value of 120 min, and the rapid increase to 39.7 mIU/L again after the fall. The observation group the level of glycated hemoglobin, insulin water, waist circumference compared with the control group, the difference was statistically significant ($P < 0.05$), therefore, after lunch 30 point min of moderate-intensity exercise intervention to reduce blood glucose and insulin IGT the best effect of female college students [Table 3].

Table 1: General information

Group	*n*	Age	Weight (kg)	Height (cm)
Observation group	13	18±1.1	45±2.4	152±1.21
Control group	12	20±1.2	55±0.85	168±1.24
t		0.322	1.721	0.485
P		0.035	0.045	0.071

Table 2: Comparison of GAUC, IAUC, and IBUA at different time

Group	*n*	GAUC	IBUA	IAUC	*t*	*P*
Observation group	13	1162.1±71.4	72,140±52.5	1170±10.21	5.32	0.001
Control group	12	4322±70.2	3265±31.92	1169±98.24	92.72	0.000

GAUC: Glucose area under the curve, IAUC: Incremental area under the curve, IBUA: Independent baseball umpires association

Discussion

Exercise decreased the level of postprandial blood glucose and blood insulin, and the blood glucose level of 35 min after meal was significantly lower than 15 min ($P < 0.05$). The peak blood glucose peak of 15 min after meal was significantly lower than that in the rest group ($P < 0.05$), and there was no difference between the different exercise intensity.

Conclusions

Prevention of diabetes, especially exercise intervention, is most important. This study provides a theoretical basis for the purpose of controlling postprandial blood glucose for the IGT young female college students with a high risk of diabetes and provides a reference for the healthcare of college female college students, and recommends a moderate-intensity exercise of 30 min after 30 min points after a meal, to achieve postprandial blood glucose and the pancreas. The long-term control of islet level should be controlled in depth. The activity

Table 3: Comparison of insulin and blood glucose at different intensity

Group	*n*	Glycosylated hemoglobin level (mmol/L)	Waistline (cm)	Insulin (mmol/L)	*t*	*P*
Observation group	13	7112.1±41.4	24.4±2.08	4211.7±9.04	11.43	0.000
Control group	12	5612.1±52.2	32.1±1.14	3214.1±14.21	82.16	0.000

in the study, all participants were no abnormal reaction of gastrointestinal tract after exercise, and 30 min after meal began in the early movement of the digestive system may also need to be further study adverse effects.

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conflicts of interest

There are no conflicts of interest.

References

1. American Diabetes Association. Standards of medical care in diabetes-2010. Diabetes Care 2010;33 Suppl 1:S11-61.
2. Alberti KG, Zimmet P, Shaw J. International diabetes federation: A consensus on type 2 diabetes prevention. Diabet Med 2007;24:451-63.
3. Ko GT, Chan JC, Chow CC, Yeung VT, Chan WB, So WY, *et al.* Effects of obesity on the conversion from normal glucose tolerance to diabetes in Hong Kong Chinese. Obes Res 2004;12:889-95.
4. American Diabetes Asociation. Lifestyle intervention on patients with impaired glucose tolerance intervention effect analysis of meta. Chin J Nurs 2015;45:271-8.
5. Zimmet P. The influence of sports on the body's food intake. Hubei Sports Sci Technol 2017;25:539-41.
6. Will K. Influence of intense exercise on blood sugar and hemoglobin index of college students. Chi Sch Health 2016;31:128.
7. Alberti YM. The effect of postprandial exercise on blood glucose and insulin. China Diabetes Mag 2018;16:72-5.