The effect of endurance training on the levels of reactive protein C (CRP) plasma middle-aged men

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Abstract

The main purpose of this study was to investigate the effect of endurance training on the levels of reactive protein C (CRP) plasma is middle-aged men. Thirty-six volunteers to participate in the study, the researchers reported that among these twenty volunteers aged 40 to 50 years. and then randomly divided into two groups of ten persons and control of endurance training. Basic information about height, weight, body fat percentage and maximum oxygen consumption were measured subjects. The subjects in the fasting state were present in the laboratory for blood sampling. Five ml of blood were taken from each subject right hand vein. Then 2.5 ml of serum CRP was used to determine it. After this stage, the training for eight weeks and three sessions per week paid to do endurance training. The endurance training program included continuous running with 60 to 70% of maximum heart rate reserve were each subject that fifteen minutes in the first session began, and both sessions were one minute of added time running. Hours after the last training session, endurance and control can be "laboratories referred to as the first stage of them all blood samples were taken. Analysis of blood samples and test hypothesis, results showed: 1. Endurance exercise causes significant reduction in serum CRP were middle-aged men.

Keywords: Endurance training, CRP, middle-aged men

1. Introduction

In the present time exercise, appropriate care and regular medical examination of the factors that leads to longer shelf life and are more fruitful life. One of the most serious problems that the international community was concerned about how to provide health care (health) middle-aged people and the elderly. The cost of health programs for adult and elderly patients in care centers in the united States in 1990, equivalent to seventy-five billion dollars. a possible way to reduce these costs, keep these people (4). therefore, health promotion activities should not be withheld from these individuals. reports show that people who exercise and proper nutritional program, they can be biologically younger than age 10 to 20 years of their calendar (4). Although the physiological changes caused by aging is inevitable, but it seems that the extent of damage to health caused by aging can be reduced. Cardiovascular disease, especially
coronary problems leading cause of death in the developed world are expected to be the dominant disease by 2020. The most important reason cited atherosclerotic coronary artery disease. Histopathological changes it starts from childhood and later in life occur in several stages (4, 99, 188, 205). In fact, it can be said that the changes in the pathogenesis of atherosclerosis progression with age and eventually leads to death in the elderly. However, coronary heart disease, in adults the risk of sudden death in greatly increased, but before his death, more than half of the victims of death in sudden cardiac clinical coronary heart disease diagnosed is not (11), the identification of risk factors for cardiovascular disease may have an important role in preventing the progression of the disease. The best-known cardiovascular disease mortality factors such as age, sex, LDL-C above, smoking, hypertension, diabetes, and inactivity can cause heart disease are all risk Tam(157 ,79). has long, half cleavages fat as a standard tool to identify those at risk for subsequent cardiovascular events are, have been used, as it is now in our society is that, for the purpose of diagnosis. In a study of 27,929 healthy women aged 54/7 and subjects were monitored for eight years was observed for almost half of all cardiovascular events in women occurred when conventional risk factors (to Special lipoproteins) they are in a normal range. Therefore, researchers are looking for indicators that accurately and more sensitive, to predict cardiovascular risk (157). Long-term activity of the immune system can lead to chronic inflammation and damage to some or all parts of the body that are associated with aging and chronic disease. In cardiovascular disease, the most common risk factors are important, But the basic differences in the inflammatory condition may explain why cholesterol is not always directly associated with cardiovascular disease (113, 15). With mild inflammation, such as obesity, smoking, physical inactivity, infections and physiological changes in the aging process on the one hand, and the other is associated with risk factors for age-related diseases (105). Several studies show the development of inflammatory cardiovascular diseases and inflammation of local and systemic pivotal role in the development and progression of atherosclerosis. (175) . (174) . (79) . (204) Following tissue injury, infection, inflammation, heart attack and surgery, to prevent further damage, support the body and remove the infection and activation of repair processes, a series of reactions as a group into action Which ultimately allows the organism to return to normal function. This process is called homeostasis to inflammation and to set the initial response is that the acute phase response (APR ) say (75). With the understanding that atherosclerosis is an inflammatory process, a plasma inflammation index for predicting the risk of coronary events is considered. Some of these factors include: fibrinogen, homocysteine, reactive protein - C (CRP) , Serum amyloid A(SAA) , Haptoglobin, white blood cell count, albumin, interleukin6 (IL-6) ,Tumor necrosis factor-alpha (TNF-α) , α1 antitrypsin P-selectin , Adhesion molecules such as icam -1 vcam . However, hs-CRP The most sensitive and the most powerful inflammatory marker predictive of future risk of cardiovascular disease(11, 21, 22, 39, 41, 92, 148, 158, 159) , Therefore, increasing the amount of its base, strong independent predictors of the risk of subsequent cardiovascular events are considered(11, 22, 33, 41, 142). a variety of factors affect CRP indices. Some of these factors include the nutritional status(4,96, 117, 118, 130, 174) , blood pressure(10, 20, 43,54 ,174) , hormone therapy(20 ·33 ·175 ·179) · Supplements and antioxidants (22 ·77 ·80 ·152 ·153) · Stress(130 · 209 ·213) · smoking(19 ·24 ·53 ·70) · Fitness and lifestyle(3 ·23 ·52 ·54 ·55 ·85 ·87 ·89 ·94 ·95 ·106 ·108 · 110 ·130 ·131 ·188) · Moods(139) · There inflammatory diseases such as asthma, bronchitis, osteoarthritis, emphysema (3 ·70 ·73 ·93 ·146) · Diabetes(20 ·54 ·71 ·92 ·108 ·115 ·139 ·142 ·145 ·148 ·174) · Inheritance(76 ·174) · Alcohol consumption (20 ·42 ·54 ·71 ·130) · Body Mass Index( 20 ·32 ·54 ·79) · Overweight(3 ·10 ·16 ·32 ·46 ·54 ·61 ·71 ·79 ·81 ·95 ·101 ·123 ·139 ·152 ·175 ·186 ·194 ·200 ·209 ·214) · age(95 ·71 ·54 ·44 ·25 ·23 ·20 ·10) · Gender(10 ·23 ·33 ·54 ·71) · Menstrual cycle(72) · race(16 ·54) · Environmental conditions such as air pollution(70 ·174 ·201) And social class(25-26).

At the same time growing research evidence of the effectiveness of exercise in the prevention of cardiovascular disease and inflammation as an independent risk factor in this disease, interest in research
on inflammatory responses to exercise, especially in middle-aged to increase the study also the design was carried out.

2. Method of investigation
Since this research on human subjects and not all factors affecting the investigation to be controlled, this study used a quasi-experimental interview subjects participating in the study, twenty of them were selected for were divided randomly into two groups and control practice. All participants one week before the start of the study, completed questionnaires and medical history, anthropometric and physiological measurements were performed on them. Participants, one day before the start of the program in the laboratory, fasting blood samples were taken And then exercise group and three sessions per week for eight weeks with a certain intensity and duration of the exercise program. Upon completion of the training period, all tests were repeated with the same conditions. Choosing subjects for study, one week before the start of administrative steps for testing the physical and physiological went to the sports hall. First, consent form and medical questionnaire was completed by all patients and then under the tab with its own test to measure refer to the respective stations. In the information age, height, weight, body fat percentage and maximum oxygen consumption were recorded throughout. The subjects were asked to measure biochemical variables Two days before blood sampling is not done hard physical activity After 12 hours of fasting in a medical laboratory for blood to be present. After completing eight weeks of endurance training, all the tests were repeated with the same conditions. To search for biochemical variables, blood sampling operation after twelve hours of fasting in two stages, before and after eight weeks of training, the training took place. Firstly, for the blood of all participants were asked two days before the test, do not do hardly any physical activity Participants then attended medical diagnostic laboratory. Temperature and time in the next stage of this test was to be maintained. The right hand vein of each subject sitting and resting, five ml of blood was taken. Then 2.5 ml blood sample was left at room temperature until the clot is ten minutes. The clot was removed from the walls of the tube tests with accuracy and speed 4000 (rpm) was centrifuged for ten minutes. Serum was stored in a refrigerator at -20 ° C until the time required to identify high-sensitivity CRP serum little used. After this stage, the participants in the exercise group for eight weeks of endurance training began after the expiration of this period, and after forty-eight hours after the last training session again "All participants in the laboratory were invited as the first stage of participants' blood samples were taken and serum and plasma was stored in a refrigerator at -20 ° C, to be used when necessary. Endurance training group consisted of three sessions per week for eight weeks. Each training session includes warm-up with stretching and exercise was ten minutes. The continuous running at a constant rate and the intensity of the subjects was 60 to 70% maximal heart rate reserve. In the first session, which was run for fifteen minutes each session, a minute into added time was running. The endurance training program is to determine the duration of the pilot study were used. Pilot study was conducted in this way, after the warm-up subjects, they were asked to run specific heart rate range and a sense of failure when they realized their report. The researchers then recorded and the time spent running as a practice considered in the first session. Karonen formula was used to determine the intensity of the workout. Intensity using heart-rate belt was controlled. Heart rate zone for each patient, and if the beats are counted lower than the area to increase the speed of one's own If desired more than one region would slow down. At the end of each session, cooling by running both soft, stretch and exercise for ten minutes-was done. To coordinate, and familiar subjects of the training program and counting heart rate and attendance control subjects, three sessions of training study was considered ready before starting the program.

3. Statistical Methods
To explain the information gathered descriptive statistics and inferential statistics were used to test the research hypotheses. Descriptive statistics for the calculation of central tendency, dispersion and drawing tables were used. In the first test inferential statistics Kolmogorov – Smirnov and Leven test for homogeneity of normal distribution data were used. The study is significant for the group pre-test and post-test, t-test was used. Also, independent t-test was used to test differences between groups. All operations spss 18 statistical software was used and significance level of $p\leq0.05$ was considered. Results

4- The first hypothesis test
4-1-The null hypothesis: endurance training has no significant effect on CRP Levels in middle-aged men.

According to P value equal to 0.01, differences between pre-test and post-test measures CRP in the endurance group is significant ($p<0.05$) (Table 1). So endurance training significantly decreased CRP levels of the subjects.

Table 1. Paired t-test and post-test to compare the CRP (mg / l) endurance

<table>
<thead>
<tr>
<th>Value P</th>
<th>Degrees of freedom</th>
<th>Standard deviation</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Statistical Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01</td>
<td>9</td>
<td>2/91</td>
<td>1/08</td>
<td>4/30</td>
<td>Variable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0/82</td>
<td>3/39</td>
<td>CRP pre-workout</td>
</tr>
</tbody>
</table>

4-2-The second hypothesis test
The null hypothesis: endurance training has no significant effect on plasma fibrinogen level middle-aged men.

According to P Value of 0.000, the difference between pre-test and post-test measurements of fibrinogen in the endurance group is significant ($p<0.05$) (Table 2). So endurance training significantly decreased levels of fibrinogen treated subjects.

Table 2. Paired t-test and post-test to compare the fibrinogen (mg / dl) endurance

<table>
<thead>
<tr>
<th>Value P</th>
<th>Degrees of freedom</th>
<th>Standard deviation</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Statistical Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.000</td>
<td>9</td>
<td>4/52</td>
<td>52/57</td>
<td>329/30</td>
<td>Fibrinogen pre-workout</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>39/25</td>
<td>284/20</td>
<td>Fibrinogen after training</td>
</tr>
</tbody>
</table>

4-3-The third hypothesis testing
The null hypothesis: between CRP and perseverance in posttest control group no significant difference

According to P Value equal to 0.000, thus the null hypothesis is rejected and so the difference between the values of CRP in the control group and the endurance test was significant ($p<0.05$) (Table 3)

Table 3. Independent t tests to compare the levels of CRP control and endurance test

<table>
<thead>
<tr>
<th>Value P</th>
<th>Degrees of freedom</th>
<th>Standard deviation</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Statistical Indicators</th>
</tr>
</thead>
<tbody>
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</tr>
</tbody>
</table>
The fourth hypothesis test

The null hypothesis: between fibrinogen and endurance in the control group there was no significant difference test

According to P Value equal to 0.000, thus the null hypothesis is rejected and so the difference between fibrinogen levels in the control group and the endurance test was significant (p<0.05) (Table 4)

Table 4. Independent t tests to compare the levels of fibrinogen control and endurance test

<table>
<thead>
<tr>
<th>Value P</th>
<th>Degrees of freedom</th>
<th>Standard deviation</th>
<th>Standard deviation</th>
<th>Average</th>
<th>Statistical Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>0/000</td>
<td>18</td>
<td>12/26</td>
<td>37/01</td>
<td>360/5</td>
<td>Fibrinogen / control</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>39/25</td>
<td>284/2</td>
</tr>
</tbody>
</table>

Conclusion

The results showed that endurance training reduces inflammatory markers in the middle-aged men. So we can say, reduction in inflammatory markers with this type of exercise may reduce the risk of future cardiovascular events in middle-aged men lead.

References


