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The Effect of Continuous Aerobic Exercises on the Amount of Enzymes in Male Patients with Fatty Liver

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Abstract: The aim of the present study was investigating the effect of continuous aerobic exercise on enzymes in males with nonalcoholic fatty liver. In this study, 9 patients with non-alcoholic fatty liver disease were randomly assigned to a continuous exercise group (mean age, 80.35±94.7 years, weight 17.23± 94.83 kg and height 173±0.06 cm) were divided. Each of the test subjects running on a treadmill aerobic exercise three times a week for 8 weeks and 25 to 37 minutes per session with an average of 50% to 62% heart rate reserve that was gradually applied in the exercise program conducted. In order to determine the level of liver enzymes and enzymatic methods using laboratory Biosystems kit was made in Spain, data were analyzed using t-test. The results showed that AST and ALT enzymes considering p value after 8 weeks of continuous exercise had a significant decline. None of the variables CHOL, TG, LDL, and HDL was not significantly changed after 8 weeks of continuous exercise.

Keywords: continuous exercise, liver enzymes, non-alcoholic fatty liver

INTRODUCTION

Fatty liver disease in obese, sedentary and more people with diabetes and dyslipidemia was seen. 1970 of liver disease associated with obesity in adults is detected, the first reports of hepatic fibrosis in obese children 28 years ago by Maran et al were reported in three children 10 years old (Moran et al., 1983). Increased physical activity is associated with reduced liver fat. An inverse relationship between cardiorespiratory fitness with non-alcoholic fatty liver disease outbreak has been proposed (Ogawa et al., 2007)

The studies were done in this area can be pointed to a study in 2004 in China where Chen et al studied 77 percent of obese people saw evidence of hepatic steatosis by ultrasound. In this study, considering the two indicators steatosis on ultrasound and increased alanine amino transferase levels to determine liver disease was seen in 24 percent of obese individuals (Chan et al., 2004).

Michela et al in a 2008 study effects of endurance exercise on fat in liver enzymes and obesity in both men and women looked and a final report no short-term effects of endurance exercise without weight loss on liver fat content declared (Michael, 2009).

In another study Nathan and colleagues studied 15 obese men and 8 women four weeks of aerobic exercise effect on the reduction of visceral fat and liver were examined and research results show that regular aerobic exercise reduces liver fat without changes in body weight (Nathan & Johnson, 2009).

A number of studies lower levels of liver fat in relation to the amount of physical activity have reported most of the fatigue caused by long-term aerobic activity increased (Zalbrsagy et al., 2008). In conjunction with the periodic activity, recent studies in healthy young men do interval exercise adaptations comparable to endurance exercise by spending less time offered. Many studies on the effect of physical exercise, including aerobic exercise, resistance exercise, parallel exercise (aerobic and resistance) has been improved fatty liver disease. In this regard, Kristin et al (2010) relationship between average and recovery activities in alcoholic fatty liver found on the contrary, the possibility of a significant reduction in liver fat cited in connection with intense activity (Kristin , 2011). But research on the role of continuous exercise and to determine the optimal intensity exercise has been done to improve fatty liver disease, according to the existing controversies in numerous studies given that continuous exercise time and less fatigue than its endurance exercise therefore, in this study we are trying to answer the question whether the beneficial effect of exercise in these patients will be followed?

Hypotheses

1 8 weeks of continuous exercisehas significant effect on reducing (ALT, AST) liver enzymes.

2- 8 weeks of continuous exercise on reducing TG, LDL, HDL and blood CHOL was significant.

Theoretical foundation

Liver enzymes include Serumglotamate- Oxaloacetate transaminase (SGOT) or aspartate aminotransferase (AST), Serm- glutamate- pyruvate transaminas (SGPT) or alanine aminotransferase (ALT), alkaline phosphatase, glutamyl trans-peptidase (GGT), albumin and bilirubin. The research showed that AST and ALT are the best indicators for assessing the status of liver (Levent C-Lehmann T, 2004). Transaminase enzymes are part of this category. AST amino acids are alpha-amino acids to pass the column (transfer of an amino group of the alpha acid and to see catalyzes the dark and therefore it is also called aminotransferase). ALT also provides amino acid dark or action does the opposite reaction. Level of this enzyme in many tissues of the body scattered however, higher concentrations in the liver and liver transaminase considered more as they are.

If the damage the tissues and lesions increased the level of this enzyme (Mellati, 1996). Liver Enzymes in the liver cells, liver cell destruction in the patients arrive. Their increase is a sign of destruction of liver cells (Jamali et al., 2008). Elevation of liver enzymes does not communicate directly with the severity of the disease and in 50 percent of patients with fatty liver can be seen. The increase in the advanced stages of the disease is 80 percent.

"Alanine aminotransferase" and "aspartate aminotransferase" is the most important liver enzyme that increases in the disease (the same). Unlike in fatty liver disease, alcohol use disorders, an increase in "alanine aminotransferase" of "aspartate aminotransferase" more and only in the advanced stages of fatty liver disease (cirrhosis) that overcomes the increase in "aspartate aminotransferase" can be seen. Increased liver enzymes in most cases are between 5.1 to 2 times normal. The high increase in liver enzymes (more than ten times the normal serum) in fatty liver disease is rare and raises the possibility of other liver diseases.

Increase the "Gamma glutamyl trans-peptidase," the head of the enzymes secreted by the liver, such as alcoholic fatty liver disease nonalcoholic fatty liver disease seen and signs of insulin resistance (Lee DS, et al., 2007). Bilirubin, albumin, prothrombin time and platelet blood that can indicate liver cell function is normal in the early stages of the disease and disruption they have a chance to ask cirrhosis. Bilirubin from the blood of waste products is made by the liver from the destruction of red blood cells and after detoxification by the liver, the bile and urine. Increase in bilirubin is an indicator of liver disease.

Albumin is a protein made by the liver and the responsibility to balance osmotic pressure outside the body's cells. By reducing serum albumin, water retention and abdominal swelling of the extremities may occurred. Prothrombin of blood clotting factors is produced by the liver and reduces the increased tendency to bleed in the body. Other laboratory parameters of liver function were normal in the early stages of fatty liver and only in the advanced stages (cirrhosis) are impaired; however, some patients with advanced liver disease to cirrhosis but liver enzymes are normal. In fatty liver disease hepatitis B and C are negative indicators (Jamali et al., 2008).

Of course, there coincidence fatty liver disease hepatitis C at the same time accelerating the pace of these two causes damage when compared that these diseases exist, each is alone.

Elevated levels of blood fats increase the amount of "triglyceride" "Cholesterol" and especially the “Oxidized low-density cholesterol." As well as blood sugar levels can be observed in fatty liver disease all of which is evidence of the existence of metabolic syndrome (Wong et al., 2010). Serum iron levels in the advanced stages of the disease can be high, a sign of liver disease severity. Increase "ferritin" which marks the body's iron reserves, in half of all cases of fatty liver can be seen and in fact is a sign of insulin resistance (Jamali and Jamali, 2010).

Nonalcoholic fatty liver disease

In most cases, patients have a benign course and are slow. Although it should be noted that the small number of patients the inflammation of liver cells and replace damaged tissue and then scar tissue (fibrosis), may have advanced disease and chronic liver (cirrhosis) and liver cell malignancy lead (Marrero et al., 2002). In a study of the progression of liver damage and cirrhosis in 32 to 50 percent of patients were reported in 20% of patients (Harrison et al, 2003). Now the best criterion to evaluate the course and severity of liver histology is involved, so that the extent of the inflammation and liver cell is in the making, course of the disease will be faster (Jamali and Daryani, 2010). Fatty liver disease is probably the most common cause of cirrhosis is unknown (Poonawala and Thuluvath, 2002). In a study to compare the complications of cirrhosis and liver cell malignancies between patients with cirrhosis due to hepatitis c virus and fatty liver was performed, it was observed that mortality and complications of cirrhosis were similar in both groups of patients, but the risk of malignancy in patients with cirrhosis of the liver cells of patients with cirrhosis of the liver caused by the hepatitis c is less (Hui et al., 2003).

A review of the literature

In this overview of the results of the studies will be discussed by other researchers. Shojaee, Moradi et al in 2007 with a study on 17 healthy men with an average age of 53 and BMI = 25-30 three times a week for 20 minutes per session with $VO2_{\max=}$60 to 80% for 6 weeks were trained, significant changes in metabolic parameters improved insulin without changes in BMI, fat, muscle and liver were reported (Shojaee et al., 2007). Michela et al in a 2008 study effects of endurance exercise on fat in the liver, enzymes and obesity in both men and women surveyed in the study of the waist, liver size, percentage of body fat, bilirubin, Glutamyl transferase alanine aminotransferase and 20 male and female obese and 21 normal-weight men and women before and after 12 weeks of endurance exercise measure, the results of this study has no change in liver size, body weight, body fat percentage, bilirubin, alanine aminotransferase reported on the effects of endurance exercise and eventually the short-term effects of endurance exercise without weight loss on liver fat content declared (Michela et al., 2008). Bonekamp (2008) on 45 patients with type 2 diabetes aged 65 to 40 with an average of 45 minutes of moderate-intensity aerobic activity in addition, three times a week for 6 months did the resistance, and Michela et al (2008) study examines correlation between cardiovascular fitness in the fatty liver, their research on 293 men and solidarity cardiovascular fitness with fatty liver (r = - 0.24) was announced (Kaljl, 2009)

Straznicky et al (2011) Effect of 12-week weight loss diet along with diet and exercise of moderate intensity on the amount of liver enzymes in 36 overweight men and women with metabolic syndrome aged BMI= (6± 55) and (41 ± 32.7) examined and 45% said the weight loss diet and the diet plus exercise group, 49% and 20% reduction of liver enzymes in the diet group and the diet plus exercise group had a 24% reduction (Straznicky et al., 2011).

In short, fatty liver disease in obese, sedentary and more people with diabetes and dyslipidemia was seen. Of course, taking certain medications can also cause fatty deposits in the liver; rapid weight loss in those who are already obese can have the following problem (Chan et al., 2004). Exercise is a big part of treatment and it is recommended that patients with nonalcoholic fatty liver disease, this offer is based on the relationship between nonalcoholic fatty liver disease to obesity and insulin resistance. However, there is very little information on the effect of exercise on nonalcoholic fatty liver treatment. Practice principles, the principles include the manipulation of several variables, including the type of exercises in the exercise program, by movement or activity, exercise intensity (the practice) of rest between rounds, activities and exercise sessions (Faoud et al., 2007). But what is most effective exercise method is not well documented.

According to research, it can be said generally lower in fatty liver enzymes percent more research on the effect of physical activity suggests but what is most effective exercise method is not well documented.

METHODOLOGY

This study is quasi-experimental. The population of this research were all men who carried ultrasound for liver, kidney, bladder or other radiology centers in the city of Zahedan and fatty liver were notified through the statement, which was prepared in advance and it was explained how to go about the work were invited. Among the volunteers participating in the study, 9 patients were selected for the exercise protocol. They were physically and mentally healthy and none of them had any history of regular exercise program but the number of people who do the walk even short-term reported as irregular. The subjects selected for sampling and to harmonize the degree of fatty liver in people to equality of cluster sampling was used. After holding a meeting and informed consent form to participate in the survey included anthropometric indicators height; if a person's height without shoes standing perfectly upright, weight, with a minimum of clothing, waist, using a tape from the bottom of the ribs at the least prominent belly, hip circumference, with the tape measure from the highest ridge, measured and then to determine their aerobic capacity through aerobic power was estimated treadmill test blocks and they were asked to perform an ultrasound and blood tests due date to specified refer to the respective centers.

Exercise program

In this study exercise program included running for eight weeks with a repeat every other day on the treadmill, exercise intensity based on heart rate reserve (HRmax - HRrest%) + HRrest is the equivalent of $VO_{2\max}$, by polar heart-rate model (0537ce) Made in Finland was controlled and for the work-rest periods (three minutes and three minutes active rest activities) were considered. To prevent too much pressure on the participants and also observe the principle of overload volume and exercise intensity gradually increased (25 to 37 minutes). Each of the 7 minute warm-up practice sessions started and finished 7-minute cool-down. They were asked to exercise but do not do the above exercise program (Table 1)

Table 1: Exercise 8-week protocol, increasing the time and intensity gradually

Week 8	Week 7	Week 6	Week 5	Week 4	Week 3	Week 2	Week 1	
37 minutes	34 minutes	34 minutes	31 minutes	31 minutes	28 minutes	28 minutes	25 minutes	Continuous exercise
62%	62%	58%	58%	54%	54%	50%	50%	
72%	72%	68%	68%	64%	64%	60%	60%	(3 minutes)
52%	52%	48%	48%	44%	44%	40%	40%	Active rest (3 minutes)

Sonography from liver

The participants were invited to a day due to the Radiology and Ultrasound in Medicine Clinic image Zahedan attend, they were asked to determine the precise amount of fat in the liver (grade I, grade II degree III) are at least 10 to 12 hours of fasting. It performed by a radiologist and everyone liver ultrasound Ultrasound (generalelectric) GE Logiq 500 pro models made in Japan, one level of exercise protocols and a stage after more than 24 hours after the last exercise session was conducted.

Bloodletting

In this study, in two stages (first stage, second stage before and after the exercise protocol) of the participants was drawn. First of all people in one day by one laboratory scientist, after 12 to 14 hours of fasting volume is about 10 ml of blood from a vein in the elbow in vacuum tubes containing (Clot Activator) Brand Company (Golden vac) was taken. After a quarter of the samples for 15 minutes in a centrifuge at a speed of 2,500 rpm and a temperature of 37 ° C and with an accuracy of less than one percent error, was placed and separated serum was tested immediately by Hitachi. Before starting the test device was calibrated by the calibrator to measure the accuracy of testing and also by two controls serum measured during normal and pathological measurements were reviewed and approved. In order to determine the level of liver enzymes and enzymatic method of making Spain Biosystems assay kit was used. In the second stage blood that was done after eight-week exercise protocol, after more than 24 hours after the last exercise session was conducted with 12 to 14-hour fasting.

The instruments used in gathering information:
1. Precision scales Seca 0.01 Made in Germany
2. Seca height measuring instruments made in Germany
3. Tape measure (a measure of abdominal circumference, hip circumference)
4. Sensor and watch Polar ce 0537 model made in Finland
5. Technogym treadmill brands made in Italy
6. Assay kit Biosystems brand made in Spain
7. Mark Ultrasound GE (general electric), LOGIQ 500 PRO model in Japan

Hypotheses testing

The first hypothesis test

Research null hypothesis: 8 weeks of continuous exercise on liver enzymes (ALT, AST) no significant effect. In order to compare the mean levels of liver enzymes (ALT, AST) after 8 weeks of continuous t-test was used and the results are presented in Table 1.

Table 2: Results of t-test to compare the average liver enzymes after 8 weeks of continuous exercise

P	Df	T	Mean ± SD	feature	group
0.03 *	9	0.67	6.11 ± 1.30	AST (IU/L)	continuous exercise
0.00 *	9	4.35	6.75 ± 9.30	ALT (IU/L)	

* Signs statistical significance ($p < 0.05$)

As shown in Table 2 according to the AST and ALT p value after 8 weeks of exercise had a significant continuous decline, so reject the null hypothesis and the alternative hypothesis of the study will be accepted.

The second hypothesis test

The null hypothesis for research: 8 weeks of continuous exercise on the CHOL, TG, LDL, HDL, blood has no significant effect.

To compare the variables average CHOL, TG, LDL, HDL after 8 weeks of continuous t-test was used and the results are presented in Table 3.

Table 3: Results of t-test was used to compare mean scores CHOL, TG, LDL, HDL after 8 weeks of continuous exercise

P	df	T	Mean ± SD	feature	group
0.21	9	1.32	86.87 ± 36.30	TG)mg/dl(	continuous exercise
0.63	9	0.49	31.59 ± 4.90	LDL)mg/dl(	
0.39	9	0.89	6.70 ± 1.90	HDL) mg/dl(	
0.31	9	1.06	28.14 ± 9.50	CHOL)mg/dl(	

As can be seen in Table 3: With respect to any of the variables p value CHOL, TG, LDL, HDL was not significantly changed after 8 weeks of continuous exercise, null hypothesis is rejected and the alternative hypothesis is confirmed

DISCUSSION AND CONCLUSION

According to the first hypothesis test results after 8 weeks of continuous exercise in the liver enzymes (ALT, AST) were seen significantly reduced. The results of the research results Nikroo, Straznicky 2 (2011) is consistent (Nikroo et al., 2011). Serum aminotransferases can be reduced thereby reducing pathogens and damaged cells, improve liver cells called hepatocytes and decrease inflammation (42). A significant decrease in serum levels of ALT and AST can be attributed to increased insulin sensitivity of liver tissue. Various factors associated with metabolic syndrome and insulin resistance is present, even in the absence of obesity and type II diabetes, as the most important characteristic of NASH is known to cause disease (Jeffrey R. 2010) and (Shen al, 2003) appropriate exercise intensity and duration sufficient, beneficial effect on improving insulin sensitivity, changes in skeletal muscle receptor levels deep. According to the second hypothesis test results after 8 weeks of continuous exercise on blood lipids (TG, CHOL, LDL, HDL) no significant changes.

The results of the research results Michel et al. (2006) and Wu et al in line with the results Kin Isler et al (2001) is inconsistent (Kin Isler 2011), (Woo R, 1985) and (Michel, L., 2006) that the possible causes of the gender difference is because in his study all participants were women. The main carrier VLDL triacylglycerol absorption is the situation. Reference distance depends on gender and age, particularly high reference level, increases with age, and is generally higher in men than in women (Muge Yoes, 2010).

Much research shows a variety of exercises and physical activity influence on blood lipids. The effect of aerobic exercise on HDL levels in some research, especially research that their intensity is between 70 to 90 percent of HRmax been reported (Gordon, DJ, 1977). Linder et al also showed that the intensity of exercise increases HDL (Linder, 1983). Responses that are given to practice, related activities, which means that if the activity is less than the threshold, there cannot be meaningful response, if the activity is greater than the threshold increases the likelihood of significant response in all variables (Tarnopolsky, 2008). Many factors affect blood HDL level changes, such as diet, personal characteristics and drug use noted. In this study, blood lipids, due to the improvement and after the test showed no statistically significant change, it seems if the time of exercise more than 8 weeks has significant possibility of change is greater.

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