The effect of Q10 coenzyme supplement on Frap changes and HCT, WBC in male climbers' serum

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Abstract: The aim of this research was to study the effect of Q10 coenzyme supplement on Frap changes and HCT, Wbc changes in male climbers' serum. So twenty four experienced male climbers were selected randomly and divided into 2 experimental and control group. Before climbing, they consumed Q10 supplement and Placebo for two weeks. Their blood samples were analyzed in 4 different altitudes; 1500m, 2800m, 4300m and 5671m during climbing to Damavand summit. The results were considered by special kits of laboratory and auto-analyzer machine. Data were analyzed by F Test. The relation among Q10 supplement on Frap changes and HCT, Wbc was not meaningful, but altitude effects and its changes on HCT, Wbc got a meaningful relation in both groups.
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1. Introduction

Climbing is a sport with sufficient and useful effects like promotion and improvement in Hemoglobin rate and cardiac-respiratory perseverance or without of having useful effects as acute mountain sickness (AMS) like: HACE Diarrhea, Vomiting, Headache and Oxygen Deficit in environment (Armstrang, 2000; Bahrami, 2004). In 1968, during the summer Olympic Games in Mexico City, altitude effect on athletes' performance seriously attracted the mass media (Fox and Mathius, 1992). Based on related reports, Hypoxia is arising from climbing into high altitudes (Dosek, 2007). Getting an exercise extremely increases oxygen rate of body and its consuming. More consumed oxygen will make more free radicals in the body which it will result in destroying of the body cells and body wearing [Daniel L et al., 1992, Maiti , Singh et al, 2006, Malek Zadeh, 2004]. At this condition, the body uses from anti-oxidants in its around to collate with oxidants and free radicals (Cooke et al., 2008). if we remove our body needs for these substances well, it will be without of problems and the cells will be safe against the oxide getting as a result of anti-oxidant deficit in internal part [2, 8, 16]. Using anti-oxidant substances is the best solution to save the cells and to measure the ability of them in Plasma-Fe complexes or anti-oxidant capability and anti-oxidative power measuring (MalekZadeh 2004; Benzie, 2004). Thus, practicing and activity in high altitude get more contribution on free radicals making in the body (Wei-Hsun Chao et al, 1999). However, loosing appetite (Anorexia) and extreme exercising are two main scopes in living at high altitudes but sufficient caloric value and suitable nutrients are also necessary factors because it's so important issue for mountaineer's healthy system in high altitudes (who will face with loosing appetite or body weight) (Armstrang, 2000). More attempt and energy consuming during the practice or the competitions cause to make unsuitable needs in athletes' diet and making some troubles at the balance of received energy and caloric needs of the exercise particularly in preservative athletes (Edenton, 2005). Also, one of other restrictions by human's body is related to increase of red globules against outer part of Hypoxia. This reaction releases Erythropoietin hormone from the kidneys (Armstrang 2000; Magalhaes et al, 2005). Hematocryte as a percent of total volume of the blood in erythrocytes (number of red globules) cause to increase the blood volume value from %10 to %15 subsequent to permanent effect for 6 months in a height more than 4000 m [2, 15]. Due to available problems at the height and cellular balance impairing in hypoxia environment, it might change hematocryte rate at this case. There are a lot of studies that have been shown long and preservative sports activities could change blood volume rate mainly. Mountaineering field as a preservative sports has this scope in the blood which we can observe it in the mountaineers' serum, well. So, under effective and related factors on the height and hypoxia conditions, we will discuss on Q10 anti-oxidant effects with climbing into the high altitudes and its useful procedure on hematocryte rate. According to the studies in 2005 about of the height, it was shown that anti-oxidants have a defensive role and resistant force against free radicals, hypoxia, and oxidative stress. Thus, they can restore the cells and prevent from any changes (Anjana et al, 2005). Also, they play a role as a balancing state for the cells and a mediator/modifier substance inside the cells (Chen et al, 2007). Free radicals may get damage into the brain and blood cells

and make different height diseases like AMS sickness (Maiti et al, 2006). In the athletes, Q10 deficit make metabolic stress as free radicals increasing as a result of severe exercises (Cooke et al, 2008). During a research in 2004, the effect of vitamin E was considered on the serum of Himalaya mountaineers (Pomori, 7161m) after climbing to the summit for 3 weeks. I was observed that vitamin E as an anti-oxidant could prevent from mitocanderya damage stem from hypoxia (Maiti et al, 2006). Subdehi et al. (2004) reported that anti- oxidant couldn't get any effect on related indices of oxidative stress and free radicals in high altitudes. Furthermore, Zhou et al (1996) pointed to positive effects of nutrient supplements of Q10 coenzyme in aerobic sports (Zhou et al, 1996). Due to great role of Q10 as an oxidant in balancing of intercellular system, ATP formation, oxidative chain, electron diffusing inside mitocanderia and other anti- oxidants reproducing(as a mediator substance inside the cell), made the researcher to seek for this study under the contradictory results about antioxidants in different sports and athletes' performance. Also, the researcher has studied the Q10 supplement consuming effects with climbing into Damavand, anti-oxidative power variations value HCT, WBC in male's serum.

2. Materials and Methods

This research was a semi-experimental study and 24 healthy skilled male climbers with 5-15 year experience were chosen randomly. Some of them were chosen with following specifications:

Anthropometric and physiological indices such as VO_{2max}, BMI, hypodermic, fat, age, size, weight, type and procedure in mountaineering sport, experience, knowledge and educational level about climbing, strength of body, cardio-vascular power, body fitness for climbing. They were divided into experimental (n=12) and controlling group (n=12). According to the team specialist and physician advice, experimental group consumed pure Q10 coenzyme made in Webber naturals Factory of Canada, with 100mg daily (consumed concentration was considered by the age) for two weeks before climbing. Placebo group consumed placebo Dextrose with 100mg in a day for two weeks before climbing [9, 18].

Blood sampling was considered with 5cc rate in each stage under the completely controlling of nutrition in the test before climbing to the summit and during of the climbing and also with consuming of Q10 and placebo as follows:

1. For two weeks before climbing in fasting status with 1500m.
2. In the base camp of Damavand at the height of 2800 m in fasting status.
3. Before climbing into Damavand at the height of 4300 m and in fasting status.
4. After climbing into the summit in the height of 5671m and backing.

Measuring tool

This study involves following tools:

1. Maximum consumed oxygen predictor
2. Fat percent of the body
3. Measuring of fat in stomach skin.
4. Hypodermic fat measuring in the upper pelvis.
5. Size measuring
6. Calendar age
7. Mass measuring
8. Digital scale
9. Stopwatch
10. Centrifuge
11. Power generator
12. Special kits of laboratory
13. Measurable parameters such as auto analyzer laboratory scale and blood- letting tools.

Blood samples were taken to the laboratory after safe packing and freezing. They were put into the special kits such as blood sugar kit, Frap kit from Germany brand with 0.0001 as an accuracy and sensitivity. Expected results obtained through auto-analyzer machine (cell counter) from U.S.A manufacturer after the related experiments doing.

Statistical methods

Firstly, we used Kolmogorov- Smirnov test for data homogeneity and then it was used from F test (variance with test operation) at the following stage. All the statistical estimations were analyzed by Spss 20 with $a<0.05$, as a meaningful level.

3. Results

In this section, we express descriptive report and related information about of hypothesis in evaluation. Anthropometric and physiological indices as great factors of participants were as follows:

As it is shown in table 2, there is no meaningful difference among of the groups. It means that HCT levels have been observed in the groups with changing the altitude. The recent study by Tannheimom et al. (2009) has adaptation with our studies in the past. Studies show that red globules percent is increased at the first week of setting on the height especially during of two first days (Armstrang, 2000). It might be related to erythropoietin hormonal excretion from the kidney and low level of plasma volume, i.e., settling on the height cause to increase the red globules (Armstrang, 2000; Di Massimo et al, 2004). At this study, Q10 coenzyme hasn't been inferred to HCT producing or promotion. Nutrient supplement of Q10 (as an anti-oxidant) could play an

important role in damages and cellular injuries against free radicals, in practice. Also, it's necessary in energy producing and ATP on the cells. So, as before mentioned, the most important agent of HCT excretion is related to erythropoietin hormone excretion from the kidney (Armstrang, 2000). It is adapted and approved with HCT rate of Himalia region studying results by M Tannheimer successfully (Tannheimer et al, 2009).

As it is shown in table 3, there is no meaningful difference. Nazirolu et al findings (2004) is parallel with our studies about of Wbc variations in sports, also, it is parallel with Beidleman studies in 2006 completely. All individuals get heavy exercises may face with some exchanges in white globules number many studies have approved this (Beidleman et al, 2006). According to Tartibian et al. (2009), it was shown that Wbc rates have been differed in the athletes in comparison with the others perfectly. Extremely exercises make to decrease anti- oxidant rate soon and to increase white globules by cellular damage soon (Tannheimer et al, 2009). Bidleman et al (2006) got an experiment about Wbc in the blood. He showed that there are some variations in the rates and white globules number by settling on the height. Also, due to the study on Himalaya in 2004, it is shown that climbing into the height gradually (with a constant or increased rates) make to increase the white globules number in the blood (Maiti et al, 2006). It isn't observed Q10 effect on Wbc variations, but height agent contributed on Wbc changes. So, Wbc had a meaningful difference in both of the groups.

Table 1. Anthropometric and physiological indices of participants

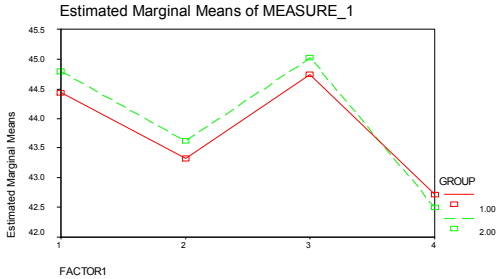
Age		Size		Weight		BMI		Hypodermic fat		Vo_{2max}	
Yrs	SD	Cm	SD	Kg	SD	W/m^2	SD	Cm	SD	Lit/min	SD
25.5	15	181	25	75	90	22	4.5	10	1.5	80	12.74

Table 2. Changes of HCT and FRAP in both groups

Controlling group					
Height		1500m		5671	
Anti -oxidative power & HCT		45+		43+	
		0.76		94	
Experimental group					
Anti- oxidative power & HCT		44.7+		43+	
		0.52		78	
P>0.05		St. df		Ave.	
Within the Group	Within the Height	Control	Experimental	Control	Experimental
97	0.005	0.44	0.34	43	43

Table 3. Changes of WBC and FRAP in both groups

Controlling group					
Height		1500m		5671	
Anti -oxidative power & WBC		5.5+		8+	
		44		0.76	
Experimental group					
Anti- oxidative power & WBC		6. 1+		8+	
		66		1	
P>0.05		St. df		Ave.	
Within the Group	Within the Height	Control	Experimental	Control	Experimental
0. 830	0. 000	42	47	7. 35	7. 28



1500 m 2800 m 4300 m 5671 m
(Height)

Figure 1. Changes of HCT and FRAP in both groups

In this figure, there is a meaningful relation between anti- oxidant power and HCT for both groups, but that's meaningful relation in different heights. The relation between serum anti -oxidant power relations and males' Wbc isn't meaningful subsequent to making of Q10 supplement and climbing on height altitude.

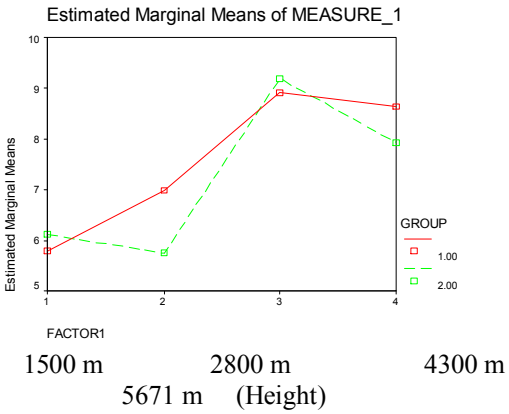


Figure 2. Changes of WBC and FRAP (qL) in both groups

As it is shown in figure 2, there isn't any meaningful difference between anti -oxidant power and wbc values. We can see this difference in height variations.

4. Discussions

Due to the results of Q10 coenzyme effect with high altitude climbing on anti- oxidant power and blood's sugar, HCT and Wbc in males' serum rates, there isn't any meaningful difference. Studies have been shown that oxygen deficit on the height get damage the balance between anti- oxidant and body's oxidant and lastly result in oxidative stress signs at the body and free radicals (Damian et al, 2001; Malek Zadeh, 2004). This stress at the height is a type of oxygen reaction in the cell which it can get damage in cellular contents like lipid membrane, mithocanderya, structural and practical proteins and even cell's nucleus and DNA (Benzie and Strain, 1996; Magalhaes et al, 2005; Maiti, 2006). In fact, height variation has been made to get some changes in blood sugar that it is decreasing with preservative action (Chen et al, 2007; Dosek et al, 2007). This study is parallel with Chen et al. (2007, 2009) results in American sports magazine, published in 2008 as named of Braun B [Chen et al, 2007, 2009). Also, some many factors are useful for this disease as follows: Age, sex, genetics, pollution, cold air and so on (Armstrang, 2000).

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